THE SIXTEENTH ANNUAL ASSEMBLY

of

THE SOUTHEASTERN SURGICAL CONGRESS

will be held in

HOLLYWOOD, FLORIDA

HOLLYWOOD BEACH HOTEL

April 5, 6, 7, 8, 1948

The following surgeons will appear on the program:

DR. HERBERT ACUFF, Knoxville, Tenn.
Presidential Address

DR. HARRY BACON, Philadelphia, Pa.
Surgical Management of Cancer of the Lower Bowel without Colostomy

DR. FREDERICK BOYCE, New Orleans, La.
Human Bites

DR. LESTER A. BROWN, Atlanta, Ga.
Is There Anything Really New in Otolaryngology?

DR. A. F. BURNSIDE, Columbia, S. C.
An Evaluation of the Treatment of Endometriosis

DR. GEORGE CURTIS, Cleveland, Ohio
The Surgery of the Spleen

DR. M. Y. DABNEY, Birmingham, Ala.
Transperitoneal Vesico-Vaginal Fistula Repair

DR. J. W. DEVINE, JR., Lynchburg, Va.
Head Injuries

DR. L. W. DOWLEN, Miami, Fla.
Inguinal Hernia Repair, with Report of 200 Cases

DR. GILBERT FISHER, Birmingham, Ala.
The Conservative and Surgical Management of Esophageal Obstruction

DR. L. J. GARIEPY, Detroit, Mich.
Carcinoma of the Gallbladder

DR. ARNOLD GRISWOLD, Louisville, Ky.
The Treatment of Peptic Ulcer by Resection of the Vagus Nerves

Dr. William G. Hamm, Atlanta, Ga.
Plastic Repair of Injuries of the Male Genitalia

Dr. Claude J. Hunt, Kansas City, Mo.
Surgical Treatment of Malignant Lesions of the Colon Complicated by Inflammatory Reaction, Fixation or Obstruction

Dr. Rudolph Jaeger, Philadelphia, Pa.
Intracranial Aneurysms; Surgical Treatment

Dr. Frank S. Johns, Richmond, Va.
Cancer of the Colon

Dr. J. Harvey Johnston, Jr., Jackson, Miss.
Acute Cholecystitis

Dr. Willoughby Kittredge, New Orleans, La.
Subcapsular Nephrectomy: Its Indications and Advantages

Dr. Herman Kretschmer, Chicago, Ill.
Some Problems Associated with Surgery of Kidney Stones

Dr. Ira Lockwood, Kansas City, Mo.
Nonobstructive Lesions of the Colon

Dr. J. G. Lyerly, Jacksonville, Fla.
Dislocated Intervertebral Disc in the Lumbar Region. Statistical Analysis of Series of Cases

Dr. Robert Major, Augusta, Ga.
Transthoracic Approach to Lesions of the Esophagus and Upper Abdomen

Dr. Samuel F. Marshall, Boston, Mass.
Tumors of the Neck

Dr. George H. Martin, Vicksburg, Miss.
Congenital Anomalies of the Gastrointestinal Tract in Infants and Children

Dr. Charles Mayo, Rochester, Minn.
Surgical Procedures for Carcinoma of the Lower Colon and Rectum

Dr. Julian A. Moore, Asheville, N. C.
The Management of Hemothorax

Dr. Carl Moyer, Dallas, Texas
Alterations in Renal Function of Man Incident to Operative Trauma and Anesthesia

Dr. Martin Nordland, Minneapolis, Minn.
Fundamental Principles in Thyroidectomy

Dr. L. M. Orr, Orlando, Fla.
Somatic Pain Simulating Uretero-Renal Disease

Dr. E. G. Ramsdell, White Plains, N. Y.
Carcinoma of the Breast, A Comparative Statistical Study

Dr. Fred Rankin, Lexington, Ky.
The Surgical Treatment of Polyposis

Dr. Henry K. Ransom, Ann Arbor, Mich.
Experiences with Total Gastrectomy

Dr. James F. Robertson, Wilmington, N. C.
The Treatment of Some Common Rectal Conditions

Dr. R. L. Sanders, Memphis, Tenn.
Palliative Treatment for Carcinoma of the Pancreas

Dr. William L. Sibley, Roanoke, Va.
Lead Poisoning in Infancy, a Case in Which Two Unnecessary Operations Were Performed

Dr. Dargan Smith, Owensboro, Ky.
Glycerin Osmotic Drainage in Peritonitis

Dr. Ambrose Storck, New Orleans, La.
Ainhum

Dr. Walter Stuck, San Antonio, Texas
Complications of Fractures of the Shaft of the Femur

Dr. H. G. Smithy, Charleston, S. C.
An Approach to the Surgical Treatment of Chronic Valvular Disease of the Heart

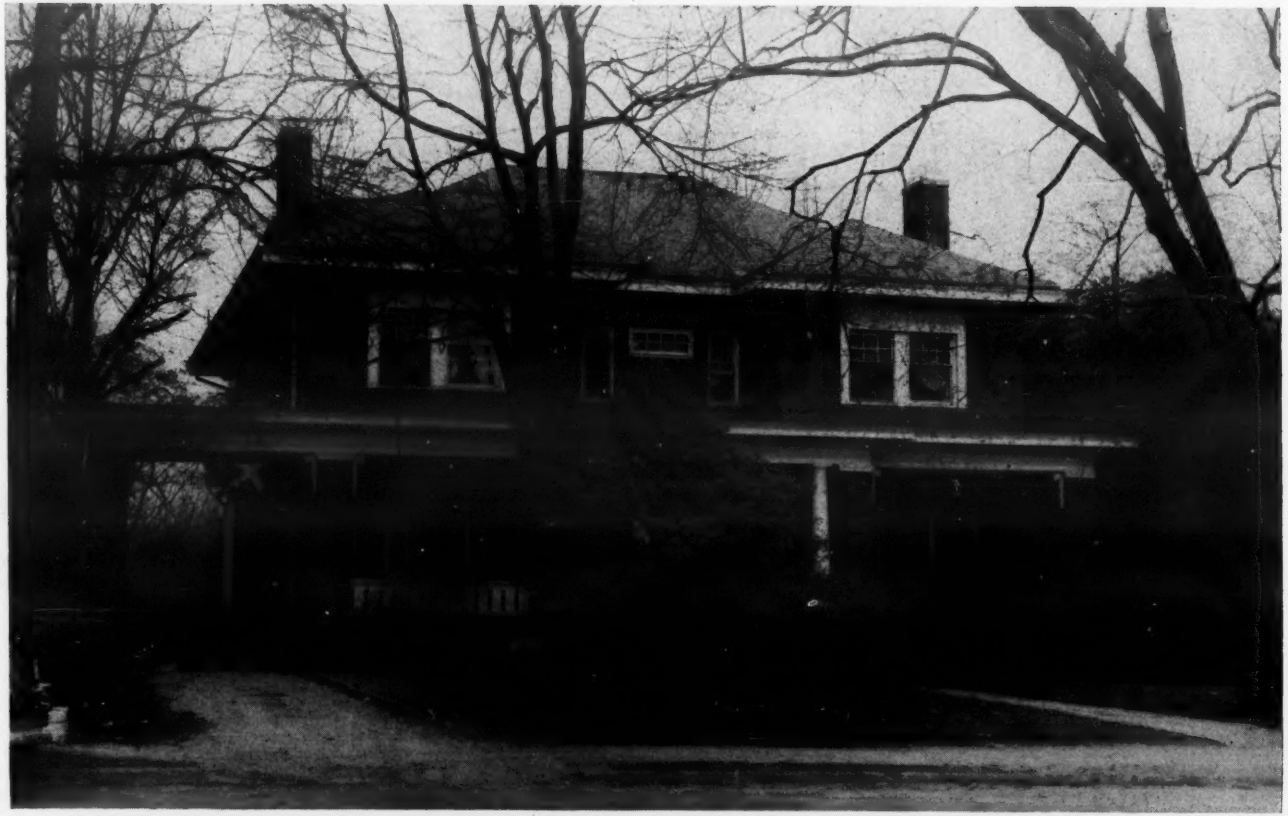
Dr. Charles C. Trabue, Nashville, Tenn.
Plastic Procedures for the General Surgeon

Dr. Joseph Webb, Huntington, W. Va.
Needle Biopsy of the Liver in Diagnosis of "Surgical" Jaundice

Dr. R. S. Widmeyer, Parkersburg, W. Va.
Child and Infant Surgery

Dr. David A. Wilson, Greenville, S. C.
The Treatment of Bilateral Apical Pulmonary Tuberculosis

Dr. John M. Wilson, Mobile, Ala.
Management of Intestinal Obstruction



Headquarters Home, The Southeastern Surgical Congress

THE NEW HOME OF THE CONGRESS

In January, 1948, the eighteen-year-old Southeastern Surgical Congress set an example in progress which could well be envied by a much older and larger organization. Dr. Herbert Acuff, President of the Congress, sponsored this project, and to him is due the honor of placing this well marked milepost in the progress of the Congress.

The Congress authorized for its home the purchase of one of the most commodious and handsome residences on famed Peachtree Street. The place, at 1439 Peachtree, northeast, formerly was occupied by Mrs. John P. Huntley and her family. In front of the house stands the three mile post, measured from the former Union Depot, on Pryor Street, which was known in older times as the "car shed."

A more ideal, convenient location could not have been chosen. The three story red brick structure stands on one of the heights of Atlanta, just before Peachtree Street begins its descent northward toward the creek of the same name. This section of Peachtree is developing into a cultural center, and the proposed home of the Congress fits well into the area. Three or four blocks south of the Huntley home is the Woman's Club of Atlanta, with a large theater where high-class entertainments are given. A short distance southward are the four buildings of the High Museum of Art, which besides offering exhibitions of fine art, has developed into a large, important art school. Four blocks beyond the former Huntley place is the recently opened home of the Atlanta Historical Society, formerly the magnificent residence of Dr. Willis Jones, who was Mrs. Huntley's son-in-law. It is interesting that all these places once were homes of noted Atlanta citizens, and on account of their large size are well adapted for their new purposes.

The new headquarters of The Southeastern Surgical Congress will house the offices of the Congress and the Southern Surgeon, and will provide a medical library and a hall for holding meetings. Truly, Dr. Beasley, who conceived the idea of the Congress, and has made it and its journal such a great success, deserves the congratulations and support of every member.

FRANK K. BOLAND, M.D.

DR. HERBERT ACUFF, *President*
The Southeastern Surgical Congress

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GREETINGS TO THE MEDICAL AND SURGICAL PROFESSION

Those of you who have attended previous meetings of The Southeastern Surgical Congress have recognized the superior type of programs presented.

The meeting at Hollywood, Florida, April 5-8, 1948, will be no less instructive in its consideration of the many phases of medical and surgical problems. The speakers have been chosen for their demonstrated ability in the subjects to be presented. The papers are diversified and are intended to make up an all-inclusive refresher course.

In addition, the Congress will initiate the largest class of surgeons in its history. The Banquet on Tuesday evening, the Convocation on Wednesday evening will be colorful, inspiring and educational.

The growing interest in The Southeastern Surgical Congress among competent surgeons and teachers in the South justifies the ideal of its Founders and makes secure its place of prestige and service in the growing family of surgical organizations of our country.

In beautiful Florida one may combine vacation and education in the same visit. We shall look forward with pleasure to seeing you in Hollywood, Florida, in April.

HERBERT ACUFF, M.D., *President,*
The Southeastern Surgical Congress.

TESTOSTERONE IN FAR ADVANCED BREAST CANCER

Preliminary Report

T. C. Davison, M.D.,
and
A. H. Letton, M.D.
Atlanta, Ga.

Ulrich[1] first reported the treatment of carcinoma of the breast with androgen, the masculinizing hormone, in 1939. Since this time we have seen various reports[2] by other individuals. In the past few years Drs. Adair and Herman[3] have done much work on this subject and have aided materially in helping to clear some of the problems.

There have been many theoretical considerations of these problems: Auchincloss[4] has reported a patient who developed cancer of the breast following large doses of estrogen; Heiberg[5] has noted that the incidence of mammary cancer is higher in women during late menopause; Herrell[6] has reported that bilateral oophorectomy exerts a protective influence against breast cancer. It has been rather universally accepted that patients with carcinoma of the breast should be castrated and that they should not receive estrogens. The relationship between estrogen and the hydrocarbon carcinogens has received much attention, which Hoffman[7] has summarized as follows: that both are growth stimulants and that apparently both can cause cancer in certain individuals—the estrogen in sex tissues only, the carcinogens in other tissue. Loeb[8] states that "estrin causes cancer formation in certain tissues because it acts as a specific and potent growth stimulus on these tissues and that its chemical relationship to some carcinogenic hydrocarbons is not the essential factor."

With these factors in mind and with the object of suppressing any estrogen formation in the body of patients with cancer of the breast, though it be formed in the ovaries, adrenals or elsewhere, large doses of androgen were suggested. This form of therapy has proved quite worth while in certain individuals.

Through the generosity of the Schering Corporation we have been privileged to use large doses of oreton on these unfortunates. We have for the most part given these people 50 mg. per day in the beginning, reducing it later to 50 mg. 3 times weekly—have watched their blood chemistries, the estrogen level as judged by vaginal smears, the change of the metastases by roentgenograms as well as by biopsies. We have summarized 8 of these case histories and present them below. (The treatment on all of these was started

at least a year ago—the oldest in point of time (J. B. S.) has been on treatment for 15 months.)

CASE 1. A. R. P., aged 55, had a radical mastectomy because of scirrhous carcinoma in February, 1946. This was followed by 6000 r. deep therapy.

Fig. 1. (Case 1.) Scirrhous Carcinoma. Metastases of ilium and ischium before starting testosterone. Patient having pain requiring morphine and crutches.

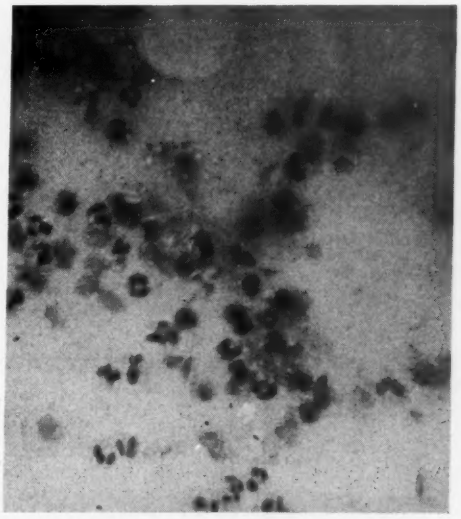

Fig. 2. (Case 1.) Vaginal smear. No estrogenic activity as shown by many leukocytes and small round epithelial cells with relatively large nuclei.

Fig. 3. (Case 1.) After taking testosterone. There is now marked increase in calcification of innominate bone and some decrease in size of metastases. No pain. Patient working in field.

Fig. 4. (Case 2.) Scirrhous carcinoma. Metastases of ilium, ischum and pubis. Patient having too much pain to walk unaided, taking morphine every 4 hours.

Fig. 5. (Case 2.) Vaginal smear. The squamous type cell indicates some estrogenic activity remaining even after large doses of testosterone.

Fig. 6. (Case 2.) After treatment. Metastases have destroyed much of the right innominate bone with only a thin shell remaining. Patient, however, has gained weight and feels pretty good, although she has some sciatic pain.

In early 1947 her physician gave her some estrogen in doses large enough to cause vaginal bleeding. Within a short time she began having pain in her hips and on admission to the clinic showed multiple metastases to the ilium and pelvis (fig. 1). At that time she was unable to walk. She was given

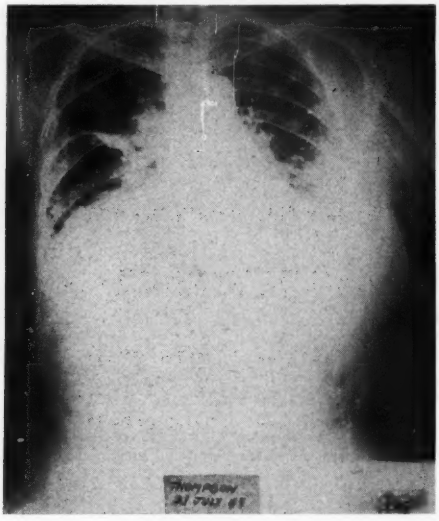

Fig. 7. (Case 3.) Scirrhous carcinoma. Metastases to ribs and lungs. Complete destruction of part of 4th right rib. Required morphine for relief.

50 mg. androgen intramuscularly each day and had complete relief of pain after taking 500 mg. After taking 2000 mg. she felt fine, had gained 6 pounds, noticed her hair on face was growing much faster, also that she had experienced "right smart" increase in libido. Her blood calcium was 12 mg. per cent, blood phosphorus 5 mg. per cent, alkaline phosphotase 3.4 Bodansky units. Vaginal smear showed no estrogenic response (fig. 2). After 3500 mg. the blood calcium was 13 mg. per cent, blood phosphorus 1.5 mg. per cent, and alkaline phosphotase 3.3 Bodansky units. The x-ray showed marked increase in amount of calcium in the innominate bone, as shown (fig. 3). After 6500 mg. she was working in the fields "digging taters."

Case 2. E. R. M., aged 39, had had radical mastectomy in June, 1944, because of scirrhous carcinoma. She had x-ray castration at that time, as well as x-radiation to the chest wall. She had bony metastases in innominate bone in February, 1946, and had received many x-ray treatments. Her x-ray at this time is shown (fig. 4). She was begun on 50 mg. androgen daily after it was decided she could take no more x-ray therapy. She was able to omit morphine and had no pain after taking 450 mg. At that time her calcium was 10.4 mg. per cent, with phosphorus 3.2 mg. per cent. After 3000 mg. she began having pain again and x-ray showed increased destruction of the innominate bone. The vaginal smear showed some estrogenic response, as shown (fig. 5). The pain is only upon movement of the leg in a certain way and not the constant ache as before. Appetite is good. She has gained from 147 to 157 pounds

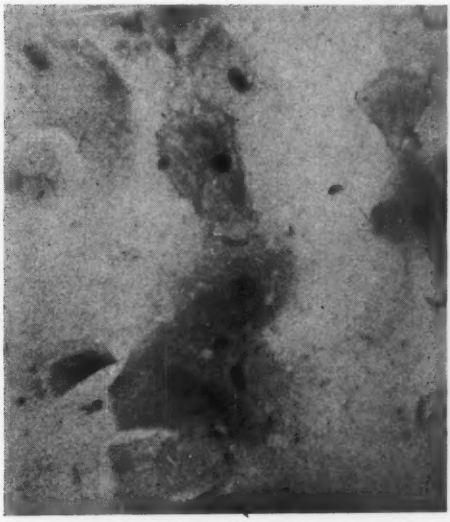

Fig. 8. (Case 3.) Vaginal smear. Squamous type cells with small nuclei show considerable estrogenic activity after large doses of testosterone.

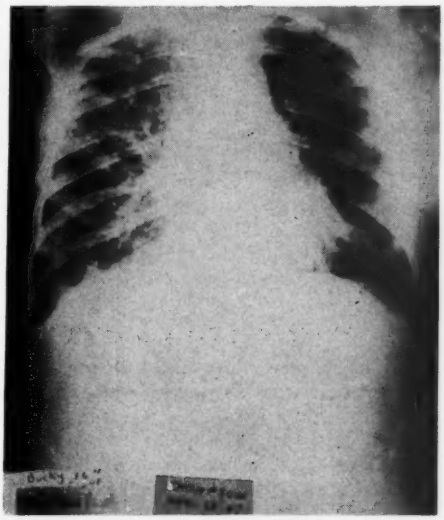

Fig. 9. (Case 3.) Lung fields look slightly improved after taking testosterone but patient was so uncomfortable with pain from respiratory movement drug was omitted, followed by rapid demise.

and is mentally euphoric. After 5950 mg. her x-ray showed considerably more destruction, and shown (fig. 6). Now the calcium is 10 mg. per cent, phosphorus 5.1 mg. per cent, alkaline phosphotase 6.7 Bodansky units. She has noticed increased hair on her face and her voice is now lower pitched. She has to date received 8000 mg.

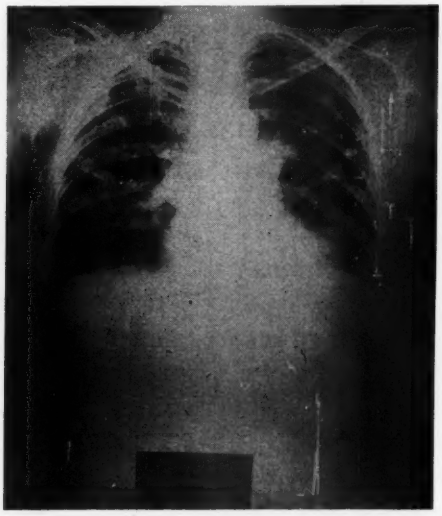

Fig. 10. (Case 4.) Scirrhous carcinoma. Multiple metastases to both lung fields ("snow storm").

CASE 3. W. C. T., aged 52, had had the menopause at the age of 46 and had undergone a radical mastectomy in December, 1946, because of scirrhous carcinoma. She had widespread bone and soft tissue metastases by March, 1947, and was started on 50 mg. testosterone per day. X-ray showed much destruction of her ribs as shown in Fig. 7. Her alkaline phosphotase was 7.4 Bodansky units. She had some relief of aching pain but any respiratory movement caused considerable pain. After 3500 mg. she still had lots of pain and a new metastasis to her leg. The calcium 14.4 mg. per cent, phosphorus 3.6 mg. per cent, alkaline phosphotase 2.1 Bodansky units. A vaginal smear showed some estrogen response (fig. 8) and she had some tibial edema. The x-ray showed some new bone formation along the line of destruction, as is shown (fig. 8). She died in September, 1947.

CASE 4. J. B. S., aged 55, went through the menopause at 45, had radical mastectomy for scirrhous carcinoma in January, 1945. In October, 1946, she developed pain in the chest with typical snowstorm in her chest due to metastases. She received large dosage x-radiation and there was little change in her x-ray by December, 1946 (fig. 10). At this time she was started on 25 mg. testosterone 3 times each week. She had alleviation of pain in about 10 days, gained 7 pounds in the next month, and went on a diet to prevent any further weight gain. In July she talked us into stopping her testosterone, but within a month she developed fluid in her right pleural cavity, which on 50 mg. testosterone daily was reabsorbed. The change in her chest x-ray is marked, as

Fig. 11. (Case 4.) Vaginal smear. Many leukocytes and small round epithelial cells with larger nuclei denote no estrogenic activity.

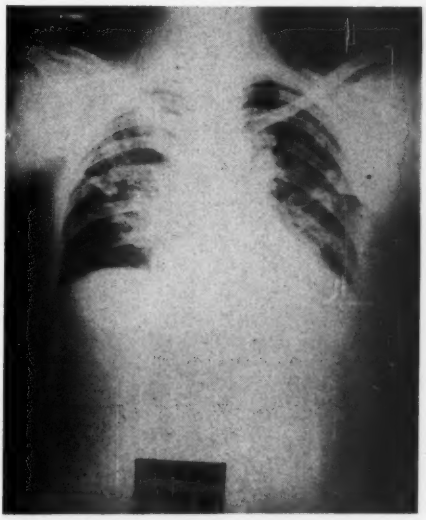

Fig. 12. (Case 4.) Metastases have gotten smaller and some apparently have disappeared after large doses of testosterone. Patient feels fine, is working every day.

shown (fig. 12). Her vaginal smear has been consistently negative for estrogenic activity (fig. 11). She has now had 6275 mg. testosterone.

Fig. 13. (Case 5.) Diffuse carcinoma. Microphotograph under oil emulsion of biopsy before treatment begun. Note large size of nuclei with active nucleolus.

CASE 5. W. O. F., aged 65. Menopause at 40. After having a mass in her breast for several years she finally consented to radical mastectomy because of a diffuse carcinoma. She had recurrence on chest and refused further x-ray treatment after the first few. When first seen she had considerable shortness of breath with fluid in her chest and a large ulcer on her left chest measuring 14 by 8 cm. She was begun on 50 mg. testosterone each day but took a bad cold and had considerable difficulty breathing. After a thoracentesis she did fairly well, her ulcer was clearing up and becoming smaller. During this time she had considerable family trouble. Her husband tried to commit suicide and while both were away someone burglarized her home. She was awfully upset, refused medicine and food. This was followed by her rapid demise. The ulcer at this time was clean and measured 10 by 6 cm. A biopsy taken before beginning treatment and on the day of her death shows a marked difference. The slides are shown (figs. 13 and 14). The cells have become packed in fibrous tissue and are smaller, more pyknotic, yet still alive. This was after only 1500 mg. testosterone. Her vaginal smear showed no estrogenizing activity (fig. 15).

CASE 6. O. L. G., aged 55. Menopause at 43. Had radical mastectomy in May, 1944, for duct carcinoma, followed by postoperative x-radiation. In October, 1944, she developed metastases in her lung and spine (fig. 16), which were treated with 4700-r without effect. In February she was started on testosterone. Her course was rapidly downhill. Her x-ray picture is shown (fig. 17). She received a total of 1200 mg. testosterone before she died in May, 1947.

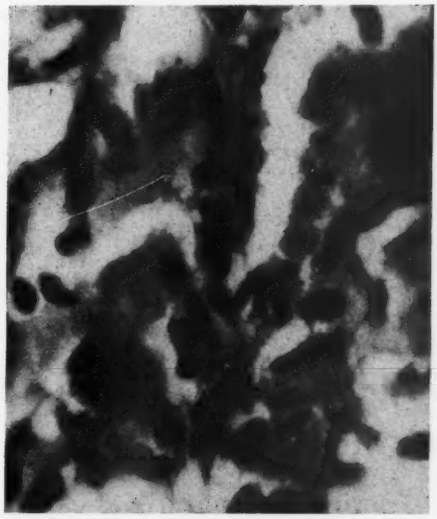

Fig. 14. (Case 5.) Microphotograph under oil emulsion of biopsy after 1500 mg. testosterone. There was much proliferation of fibrous tissue seen on low power. This area was picked from one area in which cancer cells were abundant and more active. Note the nuclei are smaller, stain darker—nucleolus not visible. Cells are viable, but not very active.

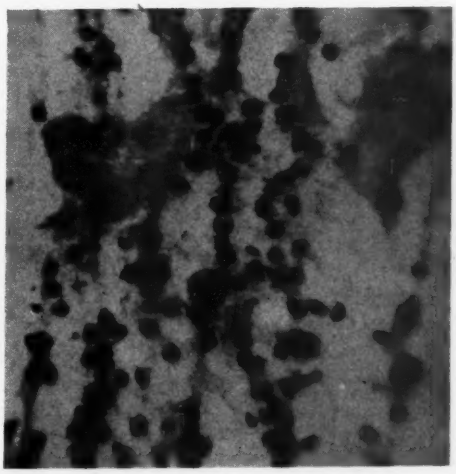

Fig. 15. (Case 5.) Vaginal smear. The numerous leukocytes and small round epithelial cells show lack of estrogenic activity.

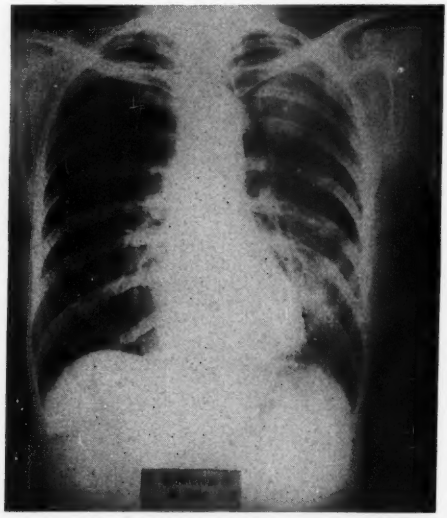

Fig. 16. (Case 6.) Duct carcinoma. Metastases to left upper lobe. There is also metastasis to 7th thoracic vertebra (not shown here).

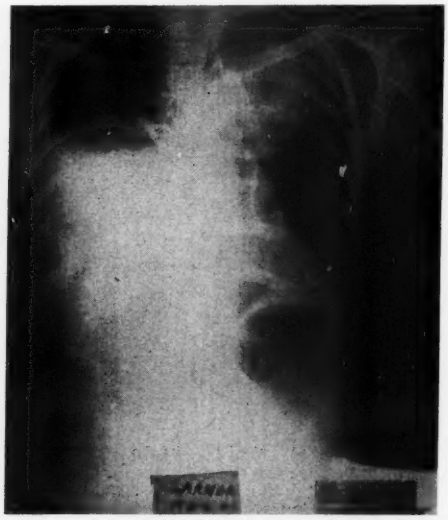

Fig. 17. (Case 6.) There has been considerable extension of metastases with fluid in right pleural cavity.

CASE 7. Mrs. L. S. F., aged 59. Menopause at 53. She presented herself to the clinic with a typical inflammatory carcinoma. She was given 4500 r

and 6 weeks later there was but little difference in the breast except for post-radiation effect. She was begun on 50 mg. testosterone daily. After 1000 mg. the breast was markedly improved and after 2000 mg. the breast was soft except for brawny induration from her x-ray therapy. This breast was slightly heavier than the other and there was a vague suspicion of an ill-defined mass behind the nipple. The calcium was 11.8 mg. per cent, phosphorus 3.1 mg.

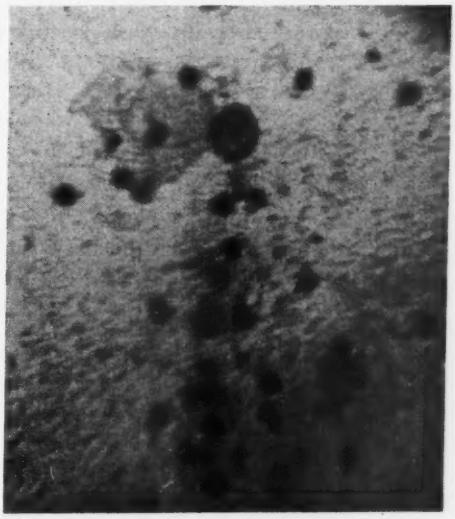

Fig. 18. (Case 7.) Inflammatory carcinoma. Vaginal smear. The squamous type cell with the small nucleus denotes estrogenic activity in spite of the small round cell and the leukocytes.

per cent. The vaginal smear showed questionable estrogenic effect. Recent correspondence says she isn't doing too well, which may be due to her hypertension or to her diabetes, as well as to her malignancy.* Some of the desirable effect may have been due to her x-ray therapy instead of to the testosterone alone. She has received a total of 5000 mg. testosterone.

CASE 8. B. C., aged 64. Had menopause at age 45. She began having considerable pain in her back and had known she had a lump in her breast for some time before coming for treatment. Examination showed multiple metastases and a mass in her left breast 4 by 4 cm, with an area of infiltration around it with typical orange peel skin. The nipple was retracted and the lymphatic ducts were infiltrated up to the axillae where there were several large axillary nodes. She was started on 50 mg. testosterone every day, with marked improvement and alleviation of pain. When next seen 5 months later (she was taking androgen during this time) she had gained weight, the axillary nodes were entirely gone as was the infiltration of the lymphatics. The mass in the breast was now 1 cm. in diameter and freely movable. The patient refused

*This patient was seen since this manuscript was prepared. Her malignancy began growing with a new fury and caused her rapid demise.

biopsy. Vaginal smear showed no estrogenic activity (fig. 10). She has had a total of 4000 mg. testosterone.

We have tried to summarize our results in these cases in Table 1. There are so many factors to be accounted for that it is quite difficult to represent them all here. Under clinical results we have classified the patients generally according to whether they had a reduction of pain, gained weight, regained their appetites and felt better in general. After weighing all these factors we classified them as Excellent (E), Fair (F), Poor (P) or Died (D). X-ray results took into account a recalcification of the metastatic areas or decrease in size of the metastases, signified by "E." X-ray remaining unchanged is represented as "F," x-ray showing continued growth, or formation of new metastases, as "P."

You will note that our patients who had bony metastases probably fared somewhat better than those with soft tissue metastases alone. The therapy apparently caused a rise in the blood calcium. The most significant finding, however, is that each patient who showed suppression of estrogenic activity of vaginal mucosa also showed good results, while those who still showed some estrogenic activity had poorer results. The individuals who show some estrogenic activity have shown other masculinizing effects in the same amounts in general as the rest of the group; the reason why the testosterone hasn't suppressed all the estrogen is as yet unsettled. There have been some follicularizing effects[7] attributed to testosterone but why this should be seen only in people having poorer results is unknown. At least we remain of unsettled mind about this phase.

Summary

1. Seven patients had some degree of relief of pain and gained some weight on this therapy.
2. Four of these 8 "hopeless' patients have returned to their regular occupations after taking large doses of testosterone.
3. One patient with soft tissue metastases only has had excellent results now for over 15 months.
4. Apparently the treatment is of temporary value only; i.e., if it is omitted there is a return of activity of the cancer.
5. Biopsy shows the cancer is being "choked" by a proliferation of fibrous tissue and that the cells, although still viable, are pyknotic and of reduced activity.
6. Good results are found in patients with depression of estrogenic

TABLE I

Summarizing patients' results and total dosage.

Patient	Present Age	Age at Menopause	Type Cancer	Location of Metastases	Estrogen Activity: Vaginal Smear	Blood Calcium After Treatment	Results			Dosage Mg. Testosterone
							Biopsy	X-ray	Clinical	
ARP	45	43	Scirrhous	Bone	0	Inc.		E	E	6500
ERM	39	x-ray	Scirrhous	Bone	+	Normal		P	F	3000
WCT	52	46	Scirrhous	Bone soft	+	Inc.		P	D	3500
BC	64	45	Unknown	Bone soft	0	—		F	E	4000
OLG	55	43	Duct	Bone soft	—	—		P	D	1200
LSF	59	53	Inflammatory	Soft	+	Inc.			D	5000
JBS	55	45	Scirrhous	Soft	0	Inc.		E	E	6275
WCF	65	40	Diffuse	Soft	0	Inc.	E	E	D	1500

E—Excellent P—Poor
F—Fair D—Died

activity, poorer results in patients who still show estrogenic activity after receiving testosterone.

7. Masculinizing effects are noted to which patients have not objected when realizing other results obtained.
8. There remain many research problems to be solved.
9. We believe that any patient with metastatic carcinoma of the breast should not only have the usually accepted treatment of surgery and x-radiation, but should also be given the benefit of a trial on large doses of testosterone with careful follow-up with blood chemistries and estrogen determinations by use of vaginal smears.

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THE SURGICAL TREATMENT OF ESSENTIAL HYPERTENSION

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ESSENTIAL hypertension or the state of elevated arterial pressure for which no cause can be found is a serious and highly complex problem. The gravity of the problem is emphasized by the fact that hypertension with its complications is now the leading cause of death in this country. The serious nature of the problem was well emphasized by Poppen[1] when he recently wrote that "Hypertension is the leading cause of death and is four times as deadly as cancer." de Takats[2] emphasizes the same point by citing a report of mortality statistics by the Metropolitan Life Insurance Company, a report which demonstrates very strikingly the fact that cardio-renal disease is the leading cause of death.

The medical management of hypertension has been and is limited to rest, sedation, adjustment to the patient's mode of life, dietary restrictions in certain instances, and the use of vasodilator and toxic depressant drugs. These methods have given palliative relief to many patients, but have probably never resulted in a true cure or permanent arrest of the disease. It should be emphasized that the course of the disease is at times difficult to predict since in some individuals the disease progresses much more rapidly than in others.

DIAGNOSIS OF ESSENTIAL HYPERTENSION

The diagnosis of essential hypertension is made by careful exclusion of a variety of conditions which have been found capable of producing a primary hypertension. Among such conditions which must be ruled out are adrenal and pituitary tumors, cerebral trauma, polycystic disease, coarctation of the aorta, and certain types of unilateral kidney disease.

THE RATIONALE OF SURGICAL TREATMENT

Probably the simplest explanation of the benefits derived by hypertensive patients from extensive sympathectomy is the concept that the blood pressure is lowered by decreasing the peripheral arterial resistance. The maintenance of normal blood pressure is directly affected by the cardiac output, the blood viscosity and blood volume and by the peripheral arterial resistance. It has been found

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that in hypertension the cardiac output, blood viscosity and blood volume remain unchanged.[3] The increased pressure is usually believed to be associated with an increased peripheral resistance. The direct relationship between vasodilation and changes in blood pressure are well known. However, the true explanation of the benefits to be derived from the surgical treatment of hypertensive patients by sympathectomy probably also involves other factors which at present are not entirely understood. Peet[4] believes that essential hypertension in most cases is due to a constriction of the renal vessels. He feels that this renal ischemia is the result of abnormal vasomotor stimuli which are transmitted from the brain to the kidney by way of the splanchnic and sympathetic nerves. It has been shown experimentally that the blood pressure may be elevated by stimulation of the splanchnic nerves. Goldblatt[5] demonstrated that gradual occlusion of one renal artery will produce hypertension in an experimental animal. Numerous investigators believe that ischemia of the kidney results in the production of a pseudoglobulin called "renin" and that "renin" is responsible for the elevation of the blood pressure in the hypertensive patient.

Extensive sympathectomy certainly affects the hemodynamics of the individual by producing vasodilatation which favors a decrease in blood pressure. It is possible, of course, that sympathectomy lowers the blood pressure by affecting some active causative mechanism of a physiologic nature which at present is not apparent. It is not known at the present time why splanchnicectomy fails to lower the blood pressure in certain hypertensive individuals. As pointed out by Smithwick[6] the answers to this question may throw much light on the cause of hypertension in man.

Method of Study and Selection of Cases

All patients are first given a careful medical examination to determine whether a demonstrable primary cause for hypertension exists and whether surgical intervention offers a reasonable chance of helping the patient. The blood pressure is taken repeatedly under standard conditions. A study of the eyegrounds affords valuable information relative to the extent of arterial changes in the body. The heart is carefully examined, an electrocardiogram is made and the heart size is accurately determined by x-ray. Kidney function is judged by urinalysis and by a determination of the nonprotein nitrogen content of the blood. In many instances further information regarding the renal state of the patient is gained from the study of intravenous or retrograde pyelograms.

A sedation test is made using sodium amytal or nembutal in repeated doses at night until the patient is sleeping soundly. The

blood pressure is taken at hourly intervals while the patient is sleeping. A significant fall in the blood pressure from sedation, especially in the diastolic pressure, is considered as evidence in favor of an encouraging response following sympathectomy. Unfortunately, there is no test which will definitely determine which patients will respond to sympathectomy. Such patients deserve the careful study of a surgeon and an internist who are both especially interested in the problem. The final decision regarding the selection of patients for surgery must rest upon clinical judgment which correlates all of the information gained from a study of the patient.

In general, patients with a low or narrow pulse pressure are considered more favorable candidates for surgery than are those with a very wide discrepancy between the systolic and the diastolic pressure. Younger patients as might be expected are better candidates for operation than are older ones. Many investigators believe that 55 is about the upper age limit for patients who should be subjected to surgery and, indeed, patients who are under 50 are preferred. The vessels in the older individuals are more apt to have undergone irreversible changes.

Surgery is contraindicated in patients with hypertension and congestive failure when the patient cannot be brought into the compensated state by medical management. Patients who have a persistently high retention of nitrogen indicative of renal failure are not candidates for surgery in my opinion. Caution should be used in suggesting surgery to a patient who is troubled by attacks of angina pectoris or who has auricular fibrillation. Extreme generalized arteriosclerosis would argue against sympathectomy since in such individuals irreversible changes have usually occurred.

In contrast to the above cases one is justified in operating upon a patient who has recovered from one cerebral accident in an attempt to prevent a recurrence. The same holds true as regards the patient who has had one attack of coronary occlusion or congestive heart failure followed by recovery. In young individuals with a rapidly progressing hypertension which is causing severe visual disturbances operation should be recommended immediately provided there are no other serious contraindications.

Surgical Procedures

The surgical approach which we advocate today has been developed as a result of a variety of procedures which have been studied in the past decade. The subdiaphragmatic splanchnic resection of Craig[7] was perhaps one of the least radical of the procedures advanced and this method has now given way to the more extensive

procedures. The bilateral supradiaphragmatic splanchnicectomy and sympathetic ganglionectomy of Peet[4,8] gave better results than the previous methods.

The thoracolumbar sympathectomy which we are performing at the present time was developed by Smithwick.[6,9] He thought that a more radical extirpation of the sympathetic ganglia and splanchnic nerves, as is accomplished by the combined thoracolumbar operation, would result in a higher percentage of good results obtained from sympathectomy. This belief has been borne out by the experience of several investigators. At the present time Poppen,[1] Hinton and Lord,[10] and Grimson[11] are advocating a still more extensive sympathectomy than that developed by Smithwick, but as yet no conclusive evidence has been presented that these procedures are more beneficial to the patient than is the thoracolumbar procedure of Smithwick.

The operation as we have performed it is carried out in two stages with an interval between operations of 2 or 3 weeks. This approach to the splanchnic nerves and to the sympathetic ganglia is both retropleural and retroperitoneal. The sympathetic chain is removed from the level of the 8th or 9th dorsal vertebra through the level of the 1st or 2nd lumbar vertebra. An intratracheal anesthetic is used. This removes the difficulty which might otherwise be encountered should the pleura be opened.

The operation itself does not carry great risk, and most hypertensive patients tolerate the procedure remarkably well. Reports of mortality for the procedure as found in a review of the literature vary from 1 per cent to 2.8 per cent. It must be borne in mind, of course, that any of these patients may suddenly suffer a fatal complication involving the brain, heart or kidney whether surgery is undertaken or not. We have had this happen when patients have been awaiting what they considered to be an opportune time to undergo operation.

Results of Surgical Treatment

The final answer regarding the permanent effect of sympathectomy on the blood pressure cannot be given at the present time. However, certain observations have been made which are of definite significance. In 1936 and 1937 Wilson, Roome and Grimson[12] and Grimson, Wilson and Phemister[13] reported the results of experimental studies which were carried out on dogs subjected to extensive sympathectomy. The information and experience gained in the experimental laboratory were useful but not directly applicable to patients with hypertensive disease. Results following extensive sym-

pathectomy in patients have been reported by only a few investigators. All of these reports, however, are in agreement that sympathectomy is a very helpful adjunct to the management of hypertensive disease. The largest series of cases and the longest follow-up period is presented by Peet.[4,8,14]

Peet states that 86 per cent of his postoperative patients who are still living, have been greatly improved as regards their symptoms of headache, nervousness and insomnia. In 81 per cent of the patients the blood pressure was significantly reduced. There was no change from the preoperative level in 13 per cent of the patients.

Ayman and Goldshire,[15] de Takats, Heyer and Keeton,[2,16] Hinton and Lord,[17] Ray, Smithwick,[18] White, et al[19] and Poppen and Lemmon[1] have reported their studies on such patients. White has emphasized the favorable changes observed in the hypertensive heart and has demonstrated that in certain cases following sympathectomy favorable changes may occur as shown by a study of the eyegrounds, electrocardiogram and diminution of the size of the heart. All authors stress the fact that, while certain patients have a restitution of the blood pressure to normal or a definite reduction in the blood pressure, there are still other patients who are symptomatically improved but who do not show a significant change in the blood pressure.

In a recent analysis of 100 patients subjected to extensive thoracolumbar sympathectomy Poppen and Lemmon reported a good result in 44 per cent, a fair result in 24 per cent, and a poor result in 22 per cent. Their mortality rate was 1 per cent. Recently Smithwick has reported the studies on 14 patients who became pregnant following sympathectomy which was performed for hypertension. He concluded from these observations that certain hypertensive women following operation might tolerate pregnancy which otherwise would be impossible or at best extremely hazardous.

Comment

The evidence as presented is in agreement that a certain number of patients with hypertension who fail to respond to medical management may be benefited by extensive sympathectomy. It is quite probable that at some uncertain time in the future better methods of treating the hypertensive patient may be found. This conceivably might consist of the use of some hormone or drug or of surgical attack upon some vasomotor center in the cranial cavity as mentioned by Poppen. Until better methods are found we are obligated to do everything possible to return as many patients to as near a normal life as is possible with the methods at hand. This is also

our attitude in the treatment of patients who have malignant disease. It has been shown that the operative mortality in carefully selected cases is low.

There are some troublesome aspects to the surgical treatment of hypertension. Such treatment requires prolonged hospitalization. Many of the patients after operation are troubled by neuralgia for several weeks. This complication is not serious but may be quite troublesome to both patient and doctor. Postural hypotension in the immediate postoperative period may require the use of elastic stockings and of an elastic girdle for several weeks in some individuals.

White[20] summed up the present status of the surgical treatment of hypertension by stating: "Although it is not yet established that the results will be permanent, at least there is good reason to believe that the hands of the clock can be set back for a number of years in the majority of younger patients with hypertension who have not been permitted to progress to the stages of advanced degeneration or changes in heart, kidney or brain."

Conclusions

1. Essential hypertension is a complex disease of great importance since the outstanding cause of death in this country is cardiovascular disease and hypertension.

2. The surgical approach by sympathectomy to the treatment of hypertension seeks to lower the blood pressure by producing a decrease in peripheral arterial resistance and also possibly by affecting active causative mechanisms of a physiologic nature which at present are not clearly understood.

3. It is felt that a careful study and selection of patients considered for operation is very important if results are to be satisfactory.

4. The thoracolumbar sympathectomy as advocated by Smithwick is thought at the present time to be the best procedure for the surgical treatment of hypertension.

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MULTIPLE PELVIC MALIGNANCIES

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During the past two decades there has been an increasing number of multiple primary malignancies reported in the literature. Occurrences of different tumors of different organs seem comparatively rare.

According to Warren,[1] Gates and Bugher,[2] an individual with carcinoma is six times more likely to develop a second carcinoma than would be expected by probability, indicating that there is a predisposition or susceptibility to carcinoma in certain persons.[3] Based on statistical reports numerous reasons for this susceptibility are explained by various hypotheses in an effort to correlate it with the original cause of cancer; however, no conclusive evidence can be drawn from the statistics and a discussion of the theories is beyond the scope of this paper.

In a review of the charts at the Steiner Cancer Clinic[4] of patients who had tumors of the colon and rectum, several cases of multiple malignant tumors were noted. One patient with epithelioma of the anus had a perineal resection and 2 years later returned with carcinoma of the cervix. This was treated with radiation and she was alive 4 years later. Another patient had carcinoma of the rectum for which an abdominoperineal resection was performed. Two years later a carcinoma of the gum appeared, spreading to the glands of the neck and terminating in death. The most frequent finding, however, when multiple lesions were present in the pelvis, was a secondary invasion either by direct contact or by implantation.

The literature is still too sparse to give any pattern of the locations of multiple malignancies, but it is interesting to note that the average age group of the ones reported is around 56 years and there is a 3 year interval between the appearances of the primary malignancies.[5]

To our knowledge an incidence of double primary ovarian cancer and an entirely separate lesion of the bowel has not previously appeared.

Report of Case

Mrs. B. I., a 57 year old white gravida 1, para 1, was admitted to the Sur-

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gical Service of Crawford W. Long Memorial Hospital from an outlying district because of intestinal obstruction. She told a story of intermittent bloody diarrhea over a 4 year period. She had been seen and worked up by a physician at the beginning of this period and surgery was advised, but for some unknown reason was refused. At times she passed dark blood, but usually the blood would be bright and mixed with feces. Some 4 weeks prior to admission she began feeling bloated and had colicky pains. Following this she became progressively distended, although she was able to pass some flatus until admission date. Seven days before admission she began to vomit. Her history otherwise was essentially negative. She had reached menopause at 52 years of age, 5 years previously, without subsequent bleeding. At no time had she had symptoms of ovarian dysfunction.

On admission she was cachectic and pale, and markedly distended. Loops of bowel could be palpated through the thin abdominal wall and peristalsis could be heard with the stethoscope as a high-pitched metallic tinkle. A scout film of the abdomen showed the typical feathery stepladder arrangement of distended bowel loops.

Pelvic examination revealed a normal cervix, but the pelvis was frozen and the anterior vaginal fornix was filled with firm fixed mass. By rectum a thick rectal shelf was palpable, as was the same pelvic mass. No obstruction could be felt and there was no blood on the examining finger. Red blood count was 3,600,000; white blood count, 8,150; hemoglobin, 11.3 Gm.

A provisional diagnosis of pelvic malignancy causing obstruction to the sigmoid was made. Because of the patient's very poor condition decompression was attempted with a Miller-Abbott tube before operation. Parenteral fluids, vitamins, proteins and whole blood were administered. The following day a barium enema showed an obstruction at the rectosigmoid junction.

Three days after admission, under spinal anesthesia and pentothal analgesia, an exploratory laparotomy was done through a low left rectus incision. The mass filling the pelvis was found to be 2 large ovarian cysts, the one on the left measuring some 20 cm. in diameter, and the one on the right some 8 cm. These were dark bluish-purple, multiloculated, and beefy and cystic to palpation. The large left ovarian cyst was removed because the rectosigmoid could not be palpated or visualized otherwise. At the rectosigmoid junction there was a typical napkin ring constriction which was thought to be an annular carcinoma. There were several peritoneal metastases in the pelvic area; however, the liver surface was smooth. The origin of the metastatic area was not determined.

At this time the patient was in rather severe shock, in spite of blood transfusion and fluids received on the table. It was felt that she would not survive further surgery other than relief of the obstruction.

A loop colostomy was done in the sigmoid area. The patient had a rather stormy convalescence, but as soon as the colostomy was opened her condition slowly improved. The constricting lesion of the sigmoid could be felt from the distal limb of the colostomy. A punch biopsy was obtained from this area.

The pathologist's report on the left ovary was "pseudomucinous cystadenocarcinoma of ovary." The gross diagnosis of the right ovary was the same. Microscopic report on the sigmoid lesion was "adenocarcinoma, grade I."

Because of the peritoneal metastases it was felt that further surgery at a later date would be useless. At the time of this writing the patient is up and

around and relatively comfortable with her colostomy, awaiting the inevitable end.

Comment

As was mentioned above this patient received an adequate work-up and was advised to have surgery 4 years before admission, when, in all probability, she could have been cured. The necessity of this treatment, however, was not sufficiently impressed upon her and, therefore, she did not accept the advice. Most of us have been shown that an abdominal colostomy is compatible with an active and satisfactory life; however, there are still some of the profession and most of the laity who associate any abdominal colostomy with a palliative colostomy, as this patient had, with all its undesirable features. An abdominal colostomy plus incurable cancer is indeed different from an abdominal colostomy minus cancer, even after resection of the primary lesion.

It is bad enough to see a hopelessly advanced malignancy at any time, but to see a patient such as this who refused treatment until too late is indeed appalling. The education of the masses regarding the management of carcinoma and the presentation of a particular problem to an individual is a real challenge to all of the profession.

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STERILITY

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STERILITY, in its broader sense, includes both failure of conception and failure of pregnancy to proceed to viability. In this paper an attempt will be made to discuss, somewhat sketchily, only failure of conception—a subject, to me, more fascinating than any I attempt to handle.

As recently as 20 years ago the sterile couple presenting themselves for study had only a 10 to 20 per cent chance of success, and that in the hands of only half a dozen physicians in the United States. At present there are numerous clinicians reporting 35 to 50 per cent successful outcome from sterility studies. An ever-increasing number of sterile couples are presenting themselves for study and the number would be far greater if chances of relief were more widely appreciated. It is estimated that 12 per cent of married couples—or about 3,000,000, suffer from involuntary sterility in the United States. The severe emotional disturbances resulting in sterile women are well recognized, as is the frequency of resulting disruption of marriage.

From ancient times male vanity has placed on the woman the responsibility of failure to conceive and she has usually accepted it unquestioningly. I have never yet had a male consult me first regarding sterility. If he is interested at all, he sends his wife in, but most often it is the wife who comes of her own accord. It is only recently that male responsibility has received full recognition. Reliable statistics place responsibility about equally on the male and female—about 40-60. Absolute sterility is, in my experience, uncommon. Rather, in the great majority of instances, an average of four or five significant factors are found in each partner, reducing fecundity.

How do we proceed then when the woman presents herself complaining of sterility? She is given a brief discussion outlining the nature and extent of the studies which will be carried out and an estimate of average cost. She is advised to obtain a copy of Hamblen's little book, "Facts for Childless Couples," to be read by herself and husband. She is told that this will give them a clear conception of the problems and studies involved and I find this a great aid in obtaining full cooperation and also quite a help to me in saving time-consuming explanations. At the first visit an extensive and detailed history is obtained from the woman and a general physical examination is done, including routine laboratory procedures. She

is given a basal temperature and menstrual record chart to keep for several months and instructions how to determine time of ovulation so that copulation may take place at the time most favorable for conception. Proper diet, rest, and exercise are advised. If intercourse occurs too frequently, as is often true, proper sexual rest is advised. Measures for the correction of either over- or underweight are advised. Arrangements are made for a Basal Metabolism Rate determination. No further plans are made for the woman until after her husband's studies are completed.

Studies of the male are much simpler than of the female. He, too, receives detailed history, physical, and laboratory examinations and similar advice in regard to general hygienic measures. After a week of sexual abstinence semen is collected, preferably by masturbation in the office—or by withdrawal. It is important that the total ejaculate be collected and that no effort be made to keep it warmer than room temperature. Semen examinations include the following:

1. Volume measurement.
2. Estimate of P.h. with Nitrazine paper.
3. Count recording the number of sperm per c.c. and in the total volume.
4. Estimates of purposeful motility at intervals up to 24 hours.
5. Viability up to 24 hours.
6. Study of stained smear for abnormal forms.

Until recently semen examinations in so-called sterility studies consisted only of a glance in the microscope and if any live sperm were seen the male was dismissed with a pat on the back and assured that he was perfectly capable of becoming a father. Actually, first class semen should have from 80 to 150 million sperm per c.c., of which 70 per cent should maintain active purposeful motility for 12 hours. Abnormal forms should not exceed 30 per cent. If defective, semen should be examined several times before being finally so classified. The male then is given a date for a Basal Metabolism Rate.

At this point, provided of course that we have found no condition making conception impossible, the Huhner test is done on the wife as follows: Normal coitus takes place and the woman plugs the vaginal entrance with cotton and presents herself at the office in an hour. Without lubrication a speculum is inserted in the vagina and semen collected from the posterior fornix. The cervix is wiped clean and material aspirated from the endo-cervix. Both are ex-

amined at once. There should be numerous active sperm from the posterior fornix and a few from the endo-cervix.

The next step is a determination of tubal patency. This is done a few days following menstruation, most commonly by the Rubin test during which carbon dioxide gas under measured pressure flows through the uterus and tubes. If the gas goes through, as proved by auscultation over the lower abdomen and pain in the shoulder on sitting up, then we have proved that at least one tube is patent. I prefer the injection of a radiopaque oily solution into the uterus and tubes with x-ray visualization in all cases. With this method I believe more information is obtained and, as Hamblen has pointed out, not infrequently pregnancy results immediately following this procedure, suggesting that the oily solution used has some effect in opening lightly closed tubes.

The next step in the woman's study is the endometrial biopsy. This is performed in the office during the first few hours of menstruation or a day or two before anticipated menstruation. Without anesthesia a Randall suction curet is passed into the uterus, the endometrium curetted lightly in several places while exerting negative pressure with a syringe, thus securing a considerable mass of endometrium. The tissue is placed in a fixing solution and stained sections prepared. I interpret the slides myself and learn from this whether or not ovulation occurred during the preceding cycle. In case ovulation has not taken place the procedure is repeated the following month for it is well known that many fertile women may occasionally fail to ovulate.

When all these studies have been finished we are in a position to sit down and analyze the whole situation as regards this couple. Possible factors are enumerated in the case of the husband and the wife. Very often we have found no one outstanding cause for failure of conception.

If definite focal infections are found these are cleared up if possible. Excess smoking and alcohol are prohibited. Overwork and mental stress are eliminated. Anemia is corrected. In all cases where there are symptoms, however mild, of thyroid deficiency, thyroid substance is administered to tolerance, regardless of the Basal Metabolism Rate. All the preceding measures apply to husband and wife alike.

In the case of the woman, uterine retroversion is corrected and proper position maintained with a pessary so that the cervix may be favorably placed for insemination. Cervical infections and erosions are common and important findings and are cleared up, if mild, by cauterization, and if extensive, by conization. Stenosed

cervices are repeatedly dilated. If both tubes are closed repeated attempts are made to reopen them with radiopaque oil injections. I have had no experience with surgical attempts at re-establishment of tubal patency. Reported successes have been too few, to my mind, to make such surgery justifiable, except in possible rare instances. If the woman does not ovulate, Hamblens 1-2 method of administering equine gonadotrophin and chorionic anterior pituitary-like substance may be tried. I have had little experience and no successful results with this therapy. If the Huhner test shows definite hostility—that is, proved normal sperm are all killed in the cervix—and no cause or cure for the hostility can be found, then artificial insemination using the husband's sperm is indicated at the time of ovulation. Such circumstances are not common. I have attempted insemination under such circumstances in 3 cases with one successful result. Of course several attempts should be made before abandonment.

On the male side defective sperm may often be improved by the hygienic measures already enumerated. Thyroid may be all that is needed. In case of impotence or marked hypospadias, making proper insemination impossible, artificial insemination should be done. If defective sperm cannot be improved then one may try artificial insemination with the hope of helping the weak sperm pass the cervical barrier. In case of absolute azoospermia the patient is referred to a urologist who may attempt catheterization of the ejaculatory ducts, testicular biopsy, and other studies. Some success has been reported lately in surgical correction of bilateral blockage of the spermatic ductal system. Chronic prostatitis probably plays little if any direct part in reducing male fecundity but may be important as a source of focal infection and for this reason should receive proper attention.

If a physician accepts a couple for sterility study he should be prepared to put a great deal of time and effort into the studies and realize that most often success comes not from the finding and correction of some major obstacle, but from detailed attention to a number of more or less minor variations from normal in both parties. As a matter of fact, when a successful result is achieved in my own practice, I seldom am able to put my finger on just what measures brought about success. However, my impression is that in the female the following conditions and their correction seem especially important:

1. Hypothyroidism.
2. Uterine retroversion.
3. Cervical disease.

In the male:

1. Hypothyroidism.
2. Overwork and worry.
3. Excess sexual indulgence.

One must admit that after most careful study there remain a considerable number of couples in whom no adequate cause for sterility can be found.

Perhaps a brief summary from the records of one more or less typical couple's studies might be of interest:

Mrs. B. L. T., aged 36, consulted me Jan. 19, 1946, complaining of sterility and dysmenorrhea. She had been previously married in 1942 but lived with this husband only a few weeks and, though there was no contraception, pregnancy did not occur. The present marriage had taken place 14 months previously. No contraceptive measures were used. Libido was normal and coitus took place in the usual position once or twice a week.

Her general health had always been good; stamina was good, but she worked hard in an office five days a week and did all her own housework besides. She had had no pelvic operations. There was no history suggestive of previous pelvic infections. Menstruation had started at age 13, regular 28 day cycles, lasting 4 or 5 days, using 18 pads and passing large clots. From the beginning she had suffered from fairly bad menstrual cramps for two days before and during the first day of the flow, and felt like going to bed but seldom did. For the several preceding months, dysmenorrhea had become increasingly severe. The last menstrual period had been normal, starting January 6. Detailed history was otherwise non-informative.

Complete physical examination showed a decidedly feminine type of woman with the general appearance of average good health. Hair distribution and body contours were normal. Pelvic examination showed a rather large cervix with a centrally placed pin hole external os and a spindle shaped enlargement between the external and internal os. The cervix pointed anteriorly and was thus very poorly placed for insemination. The uterus was of normal size, regular, firm, and in third degree retroversion. There was no pelvic masses or tenderness. The remainder of the physical examination was essentially normal.

Routine urinalyses, complete blood count, blood Wassermann test and blood sedimentation rate were all normal. Vaginal p.h. 4.5. Vaginal smear showed 3 plus estrogenic effect. Vaginal secretions were negative for yeast and trichomonae.

At the conclusion of this first visit she was given a preliminary report of findings, Basal Metabolism Rate was arranged, she was instructed to read Hamblen's book "Facts for Childless Couples" and to have her husband read it.

Mr. B. L. T., her husband, aged 40, was first seen Feb. 1, 1946. He, too, had been married previously, from 1928 to 1936. His first wife had become pregnant soon after marriage and had had a therapeutic abortion after which contraception had been followed.

He had lived in the tropics off and on for many years and suffered from frequent attacks of malaria, which presumably still recurred as he had had

chills and fever a few weeks before being seen. His general health had been poor for several years. He had had gonorrheal urethritis in 1923 of short duration and with no complications. His stamina was poor and he was very sleepy-natured. He answered questions slowly and hesitatingly.

On physical examination he appeared thin, languid and dull. Spleen was not palpable. External sexual organs were normal. The prostate was large, boggy, tender and secretion produced by massage was loaded with pus cells and clumps.

Routine laboratory procedures were all normal. Thick smear for malaria was negative. Mantoux was violently positive but chest x-ray showed only healed tubercular lesions. Unfortunately, through a misunderstanding, his Basal Metabolism Rate test was done while he had fever from the positive Mantoux reaction and was plus 25, though his symptoms suggested that the rate probably should be low. We were unable to get him to repeat the test.

On February 6 semen secured by masturbation. Examination: Volume 3 c.c. P.h. 8. Viscosity average. After an hour 80 per cent showed vigorous purposeful mobility, 75 per cent after 2 hours and 65 per cent after 6 hours. After 24 hours there were still a few fairly active sperm. Total count 358 million per c.c. Stained smear examination showed only 25 per cent abnormal forms, chiefly small heads. Impression: Excellent sperm.

From the standpoint of sterility it was felt that the following factors were significant in his case:

1. General ill health—possibly chronic malaria.
2. Clinical hypothyroidism.
3. Severe chronic prostatitis.
4. Poor general hygiene and habits.

He was given diet advice, general hygienic advice, started on a series of treatments for the prostatitis, and given thyroid substance and a multiple vitamin preparation.

At this point we return to a consideration of the wife. On February 2, Basal Metabolism Rate was minus 10. She was started on thyroid substance and a multiple vitamin preparation and advised as to general hygienic measures. She was advised to give up either her office position or her housekeeping so that it would be possible for her to get more rest and relaxation.

On February 12, uterosalpingogram showed normal uterine contour, normal tubes, and free spill into the peritoneal cavity.

On February 16, the Huhner test revealed many active sperm in the vagina and a few in the cervical canal. At this same visit the uterus was replaced in the knee-chest position and a Hodges pessary inserted and when this was checked a few days later the uterus and cervix were found to remain in excellent position and the pessary was perfectly comfortable.

On February 25, a few hours after the onset of menstruation the cervix was thoroughly dilated and endometrial biopsy was done. Incidentally, for the first time ever, this period had slipped up on her with absolutely no pain. Endometrial biopsy interpretation was that of excellent progestational effect, thus proving ovulation.

These completed the wife's studies and I consider the following factors significant in her sterility:

1. Uterine retroversion.
2. Hypothyroidism.
3. Overwork.

On March 23 she felt quite well. Thyroid dosage was increased to ¾ grain daily.

On June 22, she reported that the last menstrual period had occurred normally and painlessly on April 25 and that there had been no flow since. The breasts were sore and she mentioned bladder frequency and urgency, and nausea, with occasional vomiting. She was presumed to be pregnant and was given the usual early pregnancy advice. On July 15 she reported that she felt fine. Pelvic examination showed perfectly normal 3 months' pregnancy. She was referred to an obstetrician.

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GUNSHOT WOUNDS OF THE ABDOMEN

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THIS paper is stimulated by the handling of the 5 cases of gunshot wounds of the abdomen reported here within the past 15 months. The wealth of reports on this subject in the past 7 years may make this seem superfluous. However, these cases fall into somewhat the same category as appendicitis, in that it is only through constantly reporting cases and repeating the surgical principles involved that standard technics can be laid down, and mortality lowered. Abdominal wounds cannot be transported for any distance, and must be operated upon when the right stage of preoperative treatment is reached. Consequently, general surgeons everywhere must be prepared to handle them.

CASE 1. A 56 year old white male was admitted to the hospital 2 hours after a self-inflicted shotgun wound in the left upper quadrant of the abdomen. He had traveled about 15 miles, some of it over unpaved roads, prior to admission. Examination revealed a patient in obvious shock, but conscious and oriented. He was pulseless; blood pressure was not obtainable. Locally he had a gaping hole in the left upper quadrant of the abdomen, the edges of which showed powder burns and imbedded shot. He was given morphine intravenously, 1500 c.c. of plasma, and 500 c.c. of blood from the only donor available at the time. Within an hour his blood pressure was 120/70, his pulse of fair volume, and he was considered to be in as good condition for surgery as he would be likely to reach. His condition began to deteriorate while he was being prepared for surgery, despite additional plasma. Under ether anesthesia a left subcostal incision was made through the abdominal defect caused by the wound. Exploration revealed a loop of the upper jejunum riddled by the shot, with most of the charge and wadding lying in the posterior abdominal wall. The transverse colon was perforated innumerable times. The kidney and spleen were intact, but there was massive maceration of the anterior and posterior abdominal wall muscles. The involved small intestine was resected and an end-to-end anastomosis performed. The anterior abdominal wall was debrided. At this stage of surgery the patient expired.

CASE 2. A 36 year old white female was admitted to the hospital about one hour after being shot in the abdomen by a .32 caliber pistol. She had traveled 15 miles before admission. Examination revealed her condition to be surprisingly good. Her pulse was strong, blood pressure 100/80, and she had only moderate bleeding from the abdominal wound. The wound of entrance was midway between the umbilicus and the symphysis, and there was no wound of exit. (X-ray subsequently revealed the missile in the left sacral area.) Under ether anesthesia the abdomen was explored through a left rectus incision. There was only moderate intraperitoneal soiling and bleeding. Six perforations of the small intestine, jejunal area, and two perforations of the transverse colon were discovered; apparently the only damage. The wound of exit was

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not discovered. The jejunal wounds were sutured with two layers of fine chromic catgut. A short incision was made lateral to and above the exploratory incision, and the involved loop of transverse colon was exteriorized and held in place by a short piece of rubber tubing. No attempt was made to construct a formal colostomy loop. The exploratory wound was closed with stainless steel wire through and through sutures, and the short incision loosely closed to fit the colostomy loop.

By the fourth postoperative day the patient's temperature and pulse were normal, the colostomy was functioning well, chiefly from the anterior perforation, and she was in excellent condition. On her sixth postoperative day she was started on sulfasuccidine by mouth, and on the twelfth postoperative day she was returned to the operating room. The anterior perforation in the exteriorized colon loop was sutured. The posterior hole had closed spontaneously. The loop was freed, returned to the abdominal cavity, and the wound closed with through and through wire sutures. She had considerable fever and a rapid pulse 48 hours after this operation, due to a thrombophlebitis of the left leg. Attempted sympathetic block failed because the patient would not cooperate, and the phlebitis was treated by conservative means.

The temperature returned to normal on the sixth postoperative day, and the swelling in the leg subsided. The colostomy wound healed by first intention, and the patient was dismissed 22 days after admission. An elastic stocking worn for three months gave symptomatic relief of the phlebitis, and except for slight residual swelling of the involved leg she has remained well.

CASE 3. A colored male, aged 25, was admitted to the hospital thirty minutes after being shot in the abdomen with a pistol. Examination revealed blood pressure 100/70, and the patient in a state of moderate shock. He had a wound of entrance just to the right of the umbilicus which was bleeding freely. His abdomen was boardlike. The wound of exit was not seen. He was operated upon almost immediately with no preparation except 500 c.c. of plasma. (Great difficulty is experienced in getting blood donors for colored patients, and no one willing to donate to this man could be found.) Under ether anesthesia the patient's abdomen was explored through a left rectus incision. He had at least 12 perforations within a 3 foot area of the jejunum, plus 3 mesenteric perforations which were still bleeding briskly. There was a tremendous amount of blood and fluid in the peritoneal cavity. The involved jejunum was resected, and an end-to-end anastomosis performed. After repair of the mesenteric defect, and peritoneal aspiration the abdomen was closed with through and through wire sutures. The wound of exit was seen in the posterior abdominal wall just lateral to the left iliac artery.

Postoperatively this patient had an unusual amount of pain and distention, and it was the sixth postoperative day before he was comfortable. There was considerable drainage from the incision until the fourteenth postoperative day, but progress was uneventful after that. He was dismissed on the fifteenth postoperative day. Three months after leaving the hospital he visited the office and displayed a large incisional hernia which had followed a day of heavy lifting at his work. He has not reported for repair of this as yet.

CASE 4. A 25 year old white male was admitted to the hospital about 4 hours after being shot twice in the abdomen. He was shot during a drunken quarrel, and considered beyond aid by his friends and relatives. When he was found still alive, after lying on the ground for 2 hours, a member of the party

walked several miles, borrowed an open pickup truck, put him in the back and drove him 15 miles to town, mostly over unpaved roads. On arrival at the hospital he was in poor condition, with blood pressure 90/60, rapid pulse, skin pale and clammy. His chest was full of coarse, typically asthmatic rales. There were two bullet holes of entrance into the abdomen, one to the left and one to the right of the umbilicus, with one hole of exit in the left flank. (Subsequent x-ray revealed the second bullet imbedded in the sacrum.) In preparation and surgery 1000 c.c. of blood plasma and 500 c.c. of unmatched type "O" blood were given. (He was type "B".) The abdomen was explored under ether anesthesia through a left rectus incision. There were 12 scattered perforations of the small intestine, numerous mesenteric perforations, and one tear at the mesenteric border of the sigmoid, where the bullet had creased the intestine. There was gross spillage and peritoneal contamination, as well as marked hemorrhage. The perforations in the small intestine were closed individually with double layers of fine chromic catgut. The sigmoid laceration was exteriorized through a left McBurney type incision with some difficulty due to a short mesosigmoid. The exploratory wound was closed with through and through wire.

This man had a complete set of complications. On the third postoperative day, the exteriorized sigmoid became edematous around the retaining rubber tube. The tube was removed, and the sigmoid loop overnight retracted below muscle level. Within 18 hours fecal contamination had dissected between peritoneum and muscle and was draining through the exploratory incision. He was returned to the operating room and a wide colostomy incision made in the still exteriorized sigmoid. The exploratory wound cleared up, and his local condition improved. At the end of the third week the sigmoid openings were closed by suture and the loop returned to the abdominal cavity. Within 12 hours the exploratory wound was again draining, obviously due to failure to close a portion of the sigmoid wound. The colostomy was reopened, and the wound packed widely again, after which the exploratory incision again cleared up, but showed definite early herniation. After this episode he developed thrombophlebitis of the left leg and thigh, which persisted symptomatically until the week before his discharge.

From the tenth day after his original operation he had been steadily septic and running a daily fever out of proportion to his abdominal condition. The third week of his illness a chest x-ray revealed definite pathology in the left lower lobe. Fourteen days later a lung abscess was apparent on x-ray. Large doses of penicillin, streptomycin and sulfadiazine had no effect on the development or progress. Six weeks after injury a first stage thoracotomy was performed under local anesthesia, resecting a section of the ninth rib, packing plain gauze to the pleura. One week later a second stage was performed, resecting this time a section of the seventh rib, as x-ray had revealed the previous section to be too low. Adhesions were firm between parietal and distal pleurae. The abscess was located by needle exploration and the needle followed down with incision with actual cautery to the abscess.

The cavity was about the size of a small orange, and filled with foul-smelling pus which contained a variety of organisms. He had a distinct bronchopleural fistula. The postoperative reaction was stormy, but following the chest drainage subsequent improvement was prompt and striking. The patient was finally discharged from the hospital after 9 weeks with some chest drainage, with the abdominal exploratory wound clean, but herniated, and with only occasional

fecal drainage from the colostomy, which wound had been allowed to heal spontaneously. Follow-up over a 4 month period showed the chest healed, slight soiling from the colostomy, and the hernia still present but giving no trouble. The patient had regained his normal weight of 200 pounds. He was admitted to a Veterans' Hospital for closure of the colostomy and herniorrhaphy a few weeks ago.

CASE 5. A 38 year old white male was admitted within 15 minutes after being shot with an automatic shotgun. He had apparently been hit at least three times and possibly four. He had an avulsed area in the left temple, but no apparent skull fracture. Another deep wound which had not caused fracture or penetrated the pleura was present in the left shoulder region. There was a huge wound of entrance in the right upper quadrant of the abdomen. From it at least 3 feet of small gut protruded, grossly dirty and greasy, and feces were pouring from the wound as well as blood, bile and small intestine contents. Evidently at least two full charges had struck him in this area. He was in extreme shock when admitted. In preoperative preparation and surgery he received a total of 1500 c.c. of type "O" unmatched blood, and 1250 c.c. of plasma. Under ether anesthesia the abdominal wound was explored. Intra-abdominal damage consisted of the following: about 1 inch of the lower border of the liver in the gallbladder area was actually torn away. The upper part of the gallbladder was avulsed from its bed, and shredded. The hepatic flexure of the colon was so badly riddled that it was completely devitalized. There was at least one perforation of the common bile duct. The retroperitoneal portion of the duodenum was peppered with holes. About 3 feet of the jejunum was extruded from the abdominal wound, covered with dirt and grease, and so badly torn that its circulation was destroyed. Quantities of shot, wadding, feces, blood and bile were pouring from the wound and filled the peritoneal cavity.

The skin and abdominal wall wound were debrided. The upper part of the gallbladder was removed by simply tying the cystic duct and trimming off the torn gallbladder. The hole in the common duct was sutured. The many holes in the duodenum were covered by plicating sutures as well as possible, and the peritoneum sutured over the remainder. The involved jejunum was resected and an end-to-end anastomosis performed. No attempt at repair of the colon was made. The involved area was exteriorized as a loop down to viable gut, and brought out through the upper part of the incision. The liver was packed loosely with gauze through the upper part of the incision, and the lower part of the incision was closed with through and through stainless steel wire. The patient left the operating table in relatively good condition, but after reaction from the anesthetic his condition deteriorated and, despite additional blood and plasma, he expired 4 hours later.

COMMENT

Cases 1 and 5 represent a type which is almost always fatal. Shotgun wounds from short range produce such a great amount of tissue damage with its attendant shock they are frequently fatal even when no vital organs are involved. Both these cases were apparently beyond salvage when admitted to the hospital. The latter case particularly is a tribute to the sustaining power of adequate whole blood and plasma.

The three other cases represent the type which would ordinarily be among the simpler abdominal wounds. Yet there were 2 cases of thrombophlebitis, 2 incisional hernias, and one lung abscess among the 3 cases. Possibly the unusually long period of recumbency may have increased the incidence of phlebitis. The lung abscess occurred in the patient who had a severe chronic bronchial asthma, had been drinking alcohol, and who was a bad anesthesia problem anyway. One of the incisional hernias was due to direct contamination from inadequately exteriorized sigmoid injury. A better procedure in this case (Case 4) would have been closure of the sigmoid laceration and a colostomy proximal to the injury in a more freely movable segment.

The use of type "O" blood without crossmatching is no longer debatable. In an emergency, it is justified. In the combat area in the European campaign we used literally hundreds of units of blood of this type, most of which was flown from donor areas in the United States. There were a few reactions and a few fatalities it is true, but when speed is essential it is a justifiable risk.

Again without referring to the vast literature accumulated on this subject during the war years, I will review some general principles followed in handling abdominal wounds in combat which I believe should be used in civilian surgery.

The Evacuation Hospital to which I was assigned functioned during the entire European campaign. During that time we had over 100 exploratory operations for abdominal wounds, with an additional combined chest and abdominal series totaling nearly 30. Our operative mortality in the abdominal cases was 12 per cent, in the combined chest and abdominal cases 15 per cent, which was about the average of the theatre as a whole. When one remembers that nearly every case was complicated by injuries elsewhere, including major compound fractures, cord and brain injuries, multiple soft tissue injuries and overexposure to elements, this record is satisfactory.

Associated soft tissue wounds should ordinarily be handled after abdominal exploration, except those of the back and buttocks. If these require debridement it should be performed before abdominal exploration. Abdominal patients react very poorly to turning and handling immediately after operation.

Liver and gallbladder wounds usually require little definitive surgery. Suture is rarely possible in liver wounds, and they do well with simple drainage. The gallbladder can be removed or sutured, whichever is more convenient. Liver wounds communicating through the diaphragm with the pleural cavity should *always* be

drained abdominally. When this condition exists, the diaphragm should be closed tightly through a thoracotomy incision, preferably before the abdominal exploration, and care taken to place a drain from the liver wound through the abdominal wall at the abdominal stage. Failure to do this will result in a bile effusion into the pleural cavity, which rapidly becomes uncontrollable. These patients eventually require extensive thoracotomy with decortication of the lung before they recover from these neglected pleural biliary fistulas.

Stomach wounds usually need only simple suture repair. About the only exception is when the major blood supply is injured and partial resection required.

Spleen injuries require splenectomy almost always. Suture is not practicable. Removal can be most easily performed through a chest wall and diaphragmatic approach, rather than abdominal, an approach similar to that recently described by Carter.[1] We stumbled onto this technic accidentally while exploring chest wounds, which had penetrated through the diaphragm and injured the spleen.

Small intestine injuries may offer a choice of treatment. Numerous injuries in a relatively short length of gut can be handled most rapidly by resection and end-to-end anastomosis. Scattered wounds are best sutured individually. The decision as to whether to resect or to close multiple injuries individually depends chiefly on the time element, and the surgeon should take the more rapid course. Whichever is done, the injuries to small intestine should have initial, definitive treatment. Exteriorizing small intestine injuries, or performing external enterostomies to save time and get the patient off the table, are not justified. Patients deteriorate so rapidly with small bowel fistulas that the percentage who can be put in condition for definitive surgery is far too low to justify this procedure.

Large intestine injuries should be treated just the opposite. Wounds in the large intestine should be exteriorized whenever possible. When impossible, as in the rectum, they should be sutured and an adequate colostomy performed in a proximal segment. After 10 days the injury or colostomy can be closed and returned to the abdominal cavity with almost no reaction. This is purely a safety measure. Primary closure of colon wounds breaks down in a high percentage of cases. On the other hand, exteriorized segments are easily handled, easily closed and cause almost no reaction when returned to the abdomen, because the area is so thoroughly walled off and protected. These colostomies should be brought out through a separate incision, which will prevent contamination of the exploratory wound by fecal drainage. In the early stages of the war our instructions were to perform double-barrel colostomies with loops

suitable for spur crushing. This proved unsuccessful because of the lack of uniformity of spurs and the damage done so frequently to small gut during the crushing. Later procedure was simply to exteriorize a loop with the injury or colostomy, and this was closed by suture as described above.

Wounds of the kidney are usually repairable with suturing. The kidney has remarkable regenerative powers, and should be given a chance unless its circulation is damaged. Drainage should be provided through a flank incision. When it cannot be saved, the kidney can be removed abdominally. Ureteral damage is rare but can be repaired usually, either primarily or secondarily after temporary drainage.

Bladder wounds can be ordinarily repaired, but suprapubic drainage should be performed even in small injuries. For some reason which I cannot explain bladder wounds with spillage of urine into the peritoneal cavity are accompanied by shock all out of proportion to the injury, and this is only controlled when the urine is aspirated and the damage repaired.

Pancreatic wounds must be drained, but otherwise require no special handling unless the duct is injured. In that case, a communication into the small gut must be provided by a pancreaticoduodenostomy.

We noted repeatedly that wounds of entrance in the back and posterior abdominal wall were accompanied by more severe shock than those of the anterior wall. Frequently, damage to the back muscles and a retroperitoneal hematoma in the posterior abdominal wall caused peritoneal and shock reactions worse than actual peritoneal soiling, and intraperitoneal injury from anterior wounds. This may be due to sympathetic nerve injury. I am unable to explain it otherwise.

Summary

Five cases of gunshot wounds of the abdomen are presented. The basic principles of handling the wounds, based on experience in the last war are reviewed. No attempt was made to detail preoperative and postoperative treatment, chemotherapy, or operative procedures, since it is felt that they are so standardized and well known that it would be superfluous.

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CONTROL OF TRIGEMINAL NEURALGIA PAIN

(Bee Venom)

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Recently, Dr. R. C. Karl et al have published experimental data which seems to prove that tic douloureux is probably the result of paroxysmal ischemia of the peripheral trigeminal structures. Sudden increase in ischemia and pain may be caused by reflex vasoconstriction, either widespread or local, and evoked by afferent stimuli from the trigger area.

Histamine, amyl nitrite, 10 per cent carbon dioxide, or nicotinic acid was used on the 7 patients for the experiment. Pain was eliminated, or diminished in duration and intensity, in every patient by at least one of the vasodilators used. The longest-lasting effects were obtained with nicotinic acid and amyl nitrite.

In the last 6 years the author has treated seven attacks of tic douloureux in 5 patients with bee venom with excellent results. Three of the patients had never had attacks before, one had had one other attack which lasted 2 weeks, and the other had had a nerve injected with alcohol twice for previous attacks. The pain was greatly diminished in all cases in 45 minutes to one hour. In some instances it disappeared entirely for about 24 hours, when a gradual recurrence took place. The bee venom would relieve pain that was not relieved by a half grain of morphine.

The man who had had the nerve injection reported very excellent results with bee venom. He had relief from pain without the unpleasant symptoms which accompany the alcoholic injections.

Dosage and Method of Administration

The venom was given intradermally at the site of pain. If there were two or three areas of accentuated pain, each area was injected. A tuberculin syringe was used and .1 c.c. of solution was sufficient to make three wheals at the initial injection. In most cases there is an immediate hyperemia at the site of injection and the puncture wound may bleed for several minutes. The following day the dose is repeated and increased slightly if the patient is not free of pain. No case required anything for pain after the first injection. After the first two or three injections at daily intervals, the intervals were lengthened.

The pain, if it recurs, does so gradually and the patient has time to get back for treatment before it becomes very severe. The aver-

age length of treatment was 2 to 3 weeks and in most instances the last shot was given after a week without pain.

Bee venom causes an immediate hyperemia in the area involved and apparently has an effect which lasts from 12 to 24 hours.

This report is made on a small number of cases with the hope that bee venom will be tried elsewhere to determine if the same good results are obtained.

OPEN REDUCTION AND FIXATION OF FRACTURES OF FACIAL BONES

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WITH the great increase in automobile and other type accidents resulting in a greater number of fractures of the facial bones with all of the disfigurement, disability, and economic loss to patients, employees, and insurance companies, it is obvious that some simple and effective type of treatment of these dreaded injuries is a necessity. After a rather limited but unsatisfactory experience with the use of various types of extraoral methods of fixation, our attention was directed to the method of treatment introduced and popularized by Adams[1,2] and this report is based upon a 4 year experience in the use of his method of reduction and fixation of these disfiguring fractures. The outstanding features of this method of treatment are its simplicity, its panacea of application, the comfort it affords the patient, the lack of continuous and/or frequent adjustments necessary, the rather nontraumatic method of application making it so useful in cases associated with extensive intracranial injuries which are so often associated with these injuries, and the simple instrument armamentarium necessary in its application. This method of treatment meets the requirements of facility of operation, complete immobilization, and sound surgical principles in addition to being applicable to nearly every type fracture of the facial bones.

Fractures of this type are, in most instances, the result of direct violence and, in practically 100 per cent of cases, are compound injuries. The character of the bones involved is such that fibrous union begins early. It is important, therefore, in order to minimize infection and to get the fracture fragments in proper position, that these fractures be reduced early and completely. The associated shock must be properly and adequately treated and the physical status of the patient, regarding associated head injury, etc., must be established. The associated soft tissue injuries are best left alone until the above criteria are met. This makes it possible to treat the soft tissue injuries in combination with the reduction and fixation of the fractures.

Not all fractures of the facial bones should be treated by this

method. The exceptions are greenstick fractures of the maxilla with little or no displacement, and infections, especially in compound fractures. In the greenstick fractures, muscle pull and motion of the lower jaw against the upper jaw will usually result in proper occlusion resulting in no disability. In infections, some type of extraoral method of fixation should be used until the infection is under control and when this condition is met the appliances should be removed and wire fixation applied. With the use of the sulfa compounds and penicillin in combination, these infections are now rather satisfactorily controlled and this preliminary period of treatment can be cut to a minimal time. We should not be too reluctant to disregard this surgical principle and "wire" the fragments in proper position, even in the presence of slight to moderate infection, using, of course, large doses of sulfadiazine and penicillin in conjunction with the reduction and fixation of the fractures.

Presented with a patient with an acute facial injury, the surgeon should have no difficulty in recognizing gross fractures of the facial bones. In fractures of the maxilla with downward displacement, inspection will reveal an elongation of the middle third of the face, and if this fracture is also associated with a backward displacement of the fragments, the patient will have a "dishpan" face, especially if there are associated fractures of the nasal bones with depression. In addition to these configuration changes, there will be a mal-occlusion of the teeth. On physical examination, crepitus, instability of the maxilla, movements of the bones of the infraorbital ridges, and limitation of motion on opening and closing or side to side movements of the lower jaw should be ascertained. Instability of the maxilla can easily be determined by grasping the upper teeth or dental ridge with one hand and supporting the back of the head with the other and attempts made to move the maxilla by motions up and down and from side to side. When this is done and there are associated fractures of the infraorbital ridges, they can frequently be seen to move. A similar type grasping and movement type of testing of the lower jaw will reveal any abnormal movements of this bone. Crepitation may be elicited in any of these maneuvers. In examining one patient with a fracture of the maxilla with downward and forward displacement of the fracture fragment, we were impressed by the bleeding when the fracture fragments were separated. On replacing the fragments of the fracture, the bleeding would stop immediately. Nasal inspection with a speculum after the nares are cleared as completely as possible of the contained blood should reveal any abnormality of the alignment of the nasal bones as well as mucosal defects.

All patients with suspicious, acute, serious injuries to the face are routinely x-rayed. An antero-posterior, lateral, and a Waters position film are taken in all cases. We are impressed with the difficulty in interpretation of the films, and find that information gained on inspection and physical examination of the patient is more valuable. Special roentgenographic technic is used in the x-ray examination of suspicious fractures of the temperomandibular joint region. All films are repeated following reduction and fixation of the fractures. We are sure that information afforded by these pictures is for record only and to check the application of the wires.

Following the treatment of shock and the evaluation of the physical status of the patient, providing there are no contraindications and the condition of the patient warrants it, reduction and fixation of the fracture or fractures are done as quickly as practical. As to the choice of anesthesia, in most cases we have found local infiltration associated with nerve block and/or pentothal to be adequate. In those cases in which there is rather profuse postnasal bleeding, we use intratracheal anesthesia. We have not used open drop ether in any of the cases.

The armamentarium used in the fixation of the fractures consists of a pair of wire cutters, a roll of number 25 or 26 stainless steel wire, a dissecting set, a small drill, a wire hook, orthodontic rubber bands, and, in edentulous patients, some dental wax. This is so simple when compared with all of the material necessary to apply extraoral fixation to these type fractures.

The reduction and fixation of the bony structures are proceeded with without regard to the associated soft tissue injuries. Once the bony framework is fixed in proper position, the soft tissue injuries are repaired following standard plastic surgery methods, sacrificing as little soft tissue as possible and making every effort to obtain a primary closure of the wound or wounds. It must be remembered that the maxilla is the foundation structure of the face and that accurate reduction and absolute immobilization of fractures of this bone is of prime importance for, once this is accomplished, immobilization of the secondary fractures offers little difficulty.

The incisions used in following the method of reduction and internal fixation of fractures of the facial bones are simple, small, and leave no unsightly scars. Usually two incisions, not over 3 cm. long, on each side suffice to fix the most complicated fracture. These are located over the infraorbital ridge and over the lateral margin of the supraorbital ridge. Occasionally a third incision of comparable length will have to be made over the mandible in order that wire

fixation may be applied to a fracture of this bone. The blood supply to the tissues of the face is abundant and healing occurs quickly, and the incisions, located as they are, leave very little scarring. The one over the infraorbital ridge, being horizontal, is almost invisible, and that over the supraorbital ridge is in the edge of the eyebrow and is also inconspicuous. In many of the cases encountered, there will be soft tissue injuries at the incisional sites or near enough so that they can be used, making it unnecessary to make any additional incisions. When this is true, the wire fixation is done through the area of soft tissue injury.

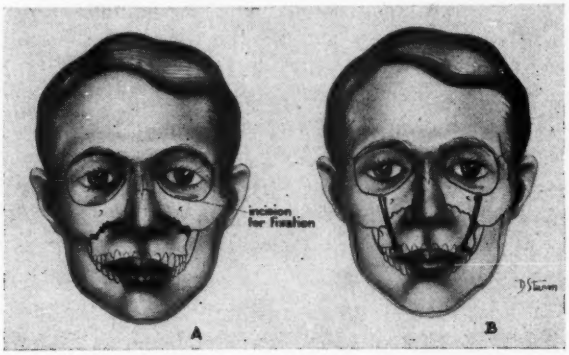

Fig. 1-a. Complete bilateral horizontal fracture of the maxilla with the lines of skin incision for fracture fixation. (Courtesy W. M. Adams, M.D., and The Mississippi Doctor, February, 1942.)

Fig. 1-b. Fractured maxilla reduced and maintained in position by wires extending from the infraorbital ridges to the upper teeth. (Courtesy W. M. Adams, M.D., and The Mississippi Doctor, February, 1942.)

Fractures of the maxilla are rarely encountered alone but are usually associated with fractures of other bones of the face including the mandible. In a simple bilateral fracture of the maxilla with displacement (fig. 1), a 2 to 3 cm. incision is made over the infraorbital ridge, a small hole large enough to accommodate a number 25 or 26 stainless steel wire is drilled through the infraorbital ridge, being cautious not to let the drill slip through and perforate the globe of the eye, and the steel wire is threaded through the hole, looped over the ridge, making tying of the wire unnecessary, and passed downward over the anterior wall of the antrums into the upper sulcus over the second molar tooth where it is grasped with a hemostat. Usually no carrier for the stainless steel wire in its transit through the soft tissues of the face is necessary for this is accomplished with ease. This same procedure is repeated on the

opposite side. When both wires are placed, the fracture is reduced, the wires are drawn taut, and fixed to one or more teeth in the region of the second molar. Once the wire has entered the mouth and it is found necessary to remove the wire for such reasons as improper application, etc., it should be cut near the infraorbital ridge and pulled out through the mouth in order that there will be as little mouth contamination of the soft tissues of the face as possible. This is recognized as the major criticism to this procedure.

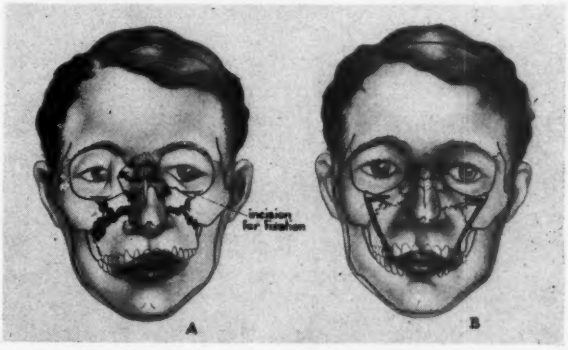

Fig. 2-a. Complete bilateral fracture of the maxilla with comminuted fractures of the nasal bones and the infraorbital ridges. (Courtesy W. M. Adams, M.D., and the Mississippi Doctor, February, 1942.)

Fig. 2-b. Fractures of maxilla, nasal bones, and infraorbital ridges reduced and held in position by wires from the infraorbital ridges to the upper teeth and the major fragments of the infraorbital ridges immobilized by separate wiring. No fixation of the small fragments which remained reduced. (Courtesy W. M. Adams, M.D., and The Mississippi Doctor, February, 1942.)

If, in addition to the simple fracture of the maxilla as described above, there is an associated fracture of the infraorbital ridge, it may become necessary to mobilize the major fracture fragment of the ridge to its outer half (fig. 2). This is done through the same incision by drilling a hole through the major fragment and threading a small loop of wire through the previously drilled hole through the infraorbital ridge and the hole through the medial fragment of the infraorbital fracture, the fracture is reduced and the wire is drawn taut and tied. Through immobilization of the large fragment, the small fragments, once reduced, will remain in place. Following this procedure, it is not necessary to pack the antrum.

If the patient is edentulous, a mold of dental wax is made around the alveolar ridge and hard palate, the wires are passed into the mouth in the above described manner and pulled across the wax

plate until they meet in the midline where they are tied. The ends are then buried in the wax plate.

If there is a fracture separation in the midline of the maxilla, the teeth of the fractured side are fixed to those of the other side. In patients with loss of teeth, an arch band may be required, or the fracture may be reduced and the fragments wired together from the labial surface. This should be done prior to reduction and fixation of the other fractures.

In cases where the maxilla is fractured and there is an associated fracture of the zygoma or malar process, an incision is made over the supraorbital ridge of the frontal bone and the easily identified ridge is cleaned of its periostium, a small drill hole placed through the ridge as in the infraorbital ridge, and the same sized wire is threaded through this hole, passed beneath the fractured zygoma or malar process into the superior sulcus above the second molar tooth and tied as in the above procedure (fig. 3). The fractured zygomatic arch or malar process is reduced prior to pulling the wire taut, and when this is done and the wire is fixed to the teeth, the fracture fragments will remain reduced because of the upward and outward pull of the wire. Without this supporting mechanism, the malar process, if completely detached, may be pulled out of line by the strong action of the masseter muscles. If there is any doubt as to the efficacy of the fixation of the malar fracture, a small drill hole should be placed in the malar bone just below the zygomatic-frontal suture line, a piece of wire threaded through this hole and that previously made in the supraorbital ridge, the fracture reduced, and the wire pulled taut and tied (fig. 4-b). The fractured zygomatic arch, once reduced, does not require fixation because it is adequately supported by the underlying temporal muscles.

After the maxillae fractures are reduced and fixed, associated fractures of the nasal bones are reduced and, in most cases, can be held in position by board splints or vaseline gauze packing. If splints or gauze is used to pack the nose, they are removed on the third or fourth postoperative day because in this period of time the fractures will have become fixed enough to maintain reduction and the possibility of obstructive infection of the accessory air sinuses will be eliminated.

In cases where there is an associated fracture or fractures of the mandible, the upper and lower teeth must be fixed together either by using dental arch bands, fixed together by rubber bands or wire, or eyelet wires about the proper teeth and fixed together with wire. In cases where there is no fracture of the mandible, there is, of

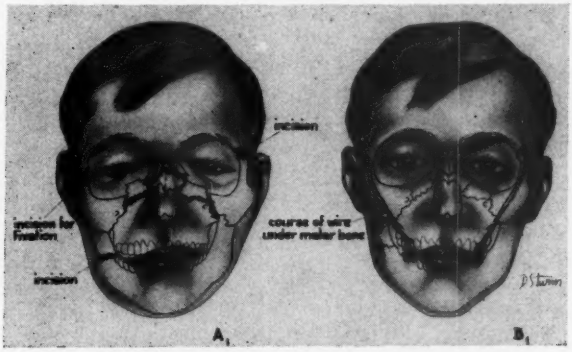

Fig. 3-a. Complete bilateral fracture of maxilla, comminuted fracture of the infraorbital ridges and nasal bones and fracture of both malar bones; fracture of right mandible just above the angle of the jaw, and the area of incision in the region of the supraorbital ridge and over the fractured malar bone and mandible. (Courtesy W. M. Adams, M.D., and The Mississippi Doctor, February, 1942.)

Fig. 3-b. The fractures in A reduced and wire passed from the frontal bone behind the body of the malar bone and attached to the upper teeth fixing the maxilla and malar bones on each side. In addition, the malar bone on the right is wired separately to the frontal bone because of marked displacement of fragments. The fracture of the right angle of the mandible is fixed by open reduction and wiring and the upper and lower teeth are wired in occlusion using eyelet wires held together by wire fixation. (Courtesy W. M. Adams, M.D., and The Mississippi Doctor, February, 1942.)

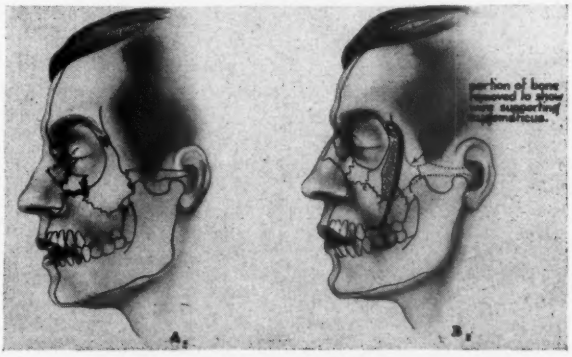

Fig. 4-a. Lateral view, left side, showing fractures of the facial bones as illustrated in Fig. 3. (Courtesy W. M. Adams, M.D., and The Mississippi Doctor, February, 1942.)

Fig. 4-b. Lateral view, showing course of the wire from the frontal bone to the upper teeth, passing beneath the zygoma, supporting the molar bone in normal position. (Courtesy W. M. Adams, M.D., and The Mississippi Doctor, February, 1942.)

course, no need for wiring the teeth together. In cases where wiring the teeth together does not seem to give adequate reduction and

fixation, a small incision should be made over the fracture site in the mandible, small holes placed through this bone, the fracture reduced, and the fixing wire pulled taut and tied. Following this procedure, the jaws should be wired together. In this type care, none of the teeth are ever removed for feeding purposes. This is absolutely unnecessary.

The postoperative care of these patients is extremely important in that such a high percentage have compound wounds and are subject to infection. As a prophylactic measure, they are all given sulfadiazine and penicillin and mouth irrigations of saline from a can held 1 to 2 feet above their heads in order that there is definite assurance that the force of the irrigating fluid will clean the mouth. The irrigations are done every 2 hours for the first 3 to 5 days, and then as necessary. If infections about the facial incisions develop, hot applications to the area or areas of infection are started immediately in addition to the medication routine which they are already getting. To date we have not had to remove any wires because of infection but such a procedure should always be kept in mind. The patients, where possible, are encouraged to brush their teeth.

The wires usually are not a source of discomfort to the patient and though they could be removed in 3 to 9 weeks, depending on their location, we tend to leave all wires in place for the full 9 weeks. The removal is a simple procedure and can be carried out in the office. They are removed by making a very small incision in the previous scar in the infraorbital and/or lateral supraorbital region, cutting the wire as it is looped over the respective ridges, and withdrawing the wires through the mouth.

The following cases are presented to indicate the proper and improper use of this procedure:

CASE 1. Mr. Z. S. was admitted to the hospital on Mar. 9, 1947, approximately 3 hours following an automobile accident in which he sustained multiple lacerations and contusions of face, arms, left hand, and shoulders. He was having severe pain in the region of the injuries in his face.

On physical examination he was found to be in moderate shock, his blood pressure was 80/40, and his pulse rate was 120. He was perspiring profusely. His respirations were 18 per minute and of a smooth and deep character. There was marked swelling and bluish-red discoloration of the major portion of his face. His left eye was ecchymotic and swollen shut. There was elongation of the mid portion of his face and malocclusion of the teeth, the upper overriding the lower. There were many small lacerations about the face. Both shoulders were the seat of multiple contusions, abrasions, and minor lacerations. There was a laceration on the dorsal aspect of the left hand and several minor lacerations on both arms.

Fig. 5-a (Case 1). X-ray film illustrating fractures of the maxilla, infra-orbital ridges, and the right ramus of the mandible.

Fig. 5-b

The patient was treated for shock, with transfusions and plasma. After the resuscitation, the lacerations about the face were debrided and sutured. When his general condition was improved he was sent to the x-ray department for study and a stereo, AP and lateral of the skull and Waters position films were made (fig. 5). These showed a complete fracture through the maxillary bone

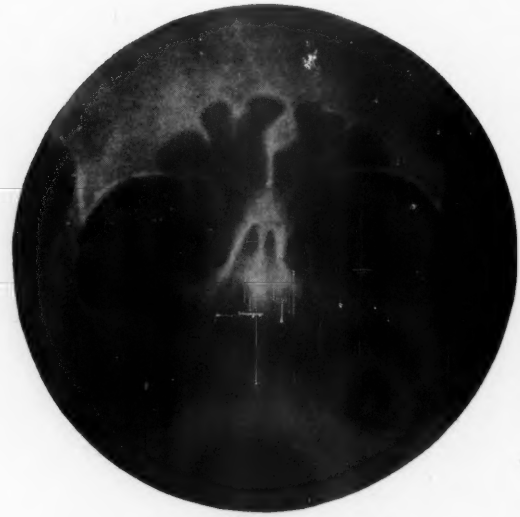

Fig. 5-c

Fig. 6-a (Case 1). Post-reduction film showing wires in position, fractures reduced and teeth wired in occlusion.

Laboratory examination on admission was essentially normal except for an elevation in his leukocyte count to 18,500.
just below the zygomatic processes with some separation of fragments, a fracture of the nasal bone, fracture of both infraorbital ridges with no separation of fragments, and a transverse fracture through the right ramus of the mandible in good position.

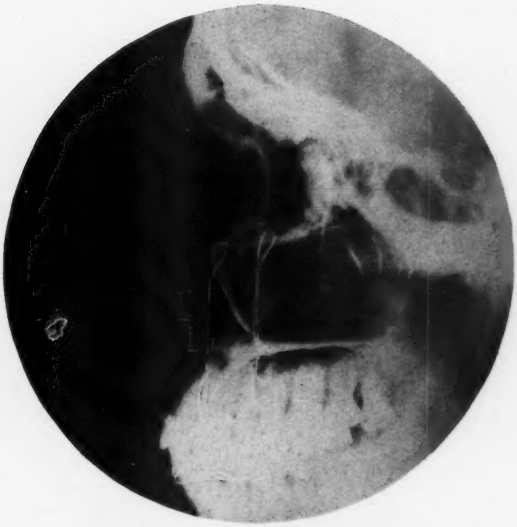

Fig. 6-b.

Fig. 6-c.

On his second hospital day, the fracture was wired following the procedure as outlined in this communication (fig. 6). A small hole was drilled in both infraorbital ridges and wires were passed downward anterior to the antrum and into the upper sulcus above the first molar tooth. The fractures were reduced, the wires pulled taut and tied around the first molar on both sides.

It was not necessary to do anything to the fractures of the infraorbital ridges as they were and remained in good position. The jaws were then wired together, using eyelet wires and orthodontic rubber bands. On first application, the wire on the left side was not satisfactory because it was not made to conform to the contour of the infraorbital ridge and protruded for a very short distance into the orbital cavity. This was noted on post-reduction x-ray films and was corrected by loosening the wire from the first molar tooth on the left side, tightening it a bit, and reapplying it to the tooth. The postoperative routine as outlined in the body of this communication was carefully followed and no infection developed. His fractures are now well healed, his occlusion is satisfactory, and he has no deformity of the face except for minor scars secondary to the soft tissue injuries.

CASE 2. Mrs. E. R., a 61 year old white female, entered the hospital 3 days following injuries sustained when struck by a passing automobile, at which time she was made unconscious and sustained multiple lacerations of the face and scalp. She was admitted immediately to another hospital where she received infusion of plasma, debridement and suture of her facial and scalp laceration, and penicillin.

Fig. 7 (Case 2). Post-reduction films showing improper application of wires from malar bones to upper teeth with a poor reduction of the fracture on the left side.

On being transferred to this hospital her eyes were swollen shut, her face markedly edematous and ecchymotic, and with the lacerations of her lower and upper lips on the left side of the face, a laceration of the forehead extending from just below the hair line down into the left eyebrow, and a small laceration on the lateral surface of the right side of the face closed by cotton sutures. She was still having periods of unconsciousness. The sclera and conjunctiva were hyperemic and markedly edematous and the nares were occluded bilaterally and contained clotted blood and a small amount of serosanguineous fluid. The fluid was not spinal fluid. There were numerous missing teeth. The rest

Fig. 7-b.

Fig. 7-c.

of the physical examination was essentially negative except for the mental status as outlined above. Two days after admission, routine x-ray studies were made which revealed a comminuted fracture of the upper part of the maxilla on the left side and fractures of the zygoma on both sides, with separation of the fracture fragments. The zygomatic fracture extended back through the ethmoids and these fragments were displaced downward and forward.

Two days after admission she was operated upon and wires were put through

small holes in both infraorbital ridges and through both zygomas, at a point considered to be lateral to the fracture site (fig. 7). At operation, a satisfactory fixation of the left side could not be obtained and on follow up x-ray study it was evident that the wires had been attached to the major fracture fragment of the zygoma. Postoperatively a depression of the left maxilla was noted and an attempt at correction was unsatisfactory. Her fracture fragments healed in this unsatisfactory position.

This case illustrates the improper application of the fixation wires for fractures of the zygoma and malar bones. The wires were not attached to the supraorbital ridges, nor were they passed beneath the fractured zygomatic processes. This incorrect application of wires resulted in an improper reduction of the fracture, union of the fracture in a poor position, and malocclusion, all of which are disfiguring and disabling.

Following this type of treatment of facial fractures, the patient is usually ready to resume his activities when healing of the soft tissue wounds has occurred. Feedings, if the teeth have to be wired together, will continue to be liquids, but that causes no trouble to the patient. The patients are followed as outpatients and the wires are removed at the proper time.

Summary

The method of Adams' type of fixation of facial fractures has been discussed, and cases have been presented indicating the proper and improper method of application of this procedure. The proized equipment, produces little discomfort in the patient, is not a cedure is simple in application, requires little in the way of specialshocking procedure and therefore can be used in patients quickly following their injury resulting in better reduction and more adequate immobilization of the fractures, does not require constant and/or frequent adjustments, and returns the patient to useful activity in a short period of time. It secures complete immobilization of the fractures and, regardless of how extensive the fractures, it has proved far simpler and more satisfactory than extraoral methods of fixation.

Though the procedure is simple in application, Case 2 as presented indicates that definite anatomic relationships and landmarks must be recognized and properly fixed to insure good results with the procedure.

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MESENTERIC LYMPHADENITIS IN CHILDHOOD

There is comparatively little in medical literature on acute mesenteric lymphadenitis in childhood. I suspect every surgeon of experience has operated upon children who presented a clinical history and physical findings of acute appendicitis but who were found at operation to have (1) marked enlargement of mesenteric lymph nodes and (2) moderate degree redness of visceral serosa of appendix, terminal ileum and cecum. The appendix is removed and with the usual postoperative care the patient recovers.

The question arises whether such cases can be differentiated from acute appendicitis preoperatively and whether non operative measures may be instituted for relief of this condition. The following differentiating points have been observed by the writer:

(1) The onset of the attack is not as sudden as is the case in acute appendicitis. Usually the history will reveal that the child has not been well for a few days before the abdominal pain begins. Often these prodromal symptoms are the usual symptoms of a cold—slight fever, loss of appetite and listlessness.

(2) When the abdominal symptoms of pain and nausea and vomiting do develop they are accompanied by more evidence of general

malaise, such as headache and general muscle soreness, than is acute appendicitis.

(3) In acute mesenteric lymphadenitis the temperature tends to be higher than that found early in acute appendicitis.

(4) There is usually present a circumoral pallor that is rarely seen in acute appendicitis.

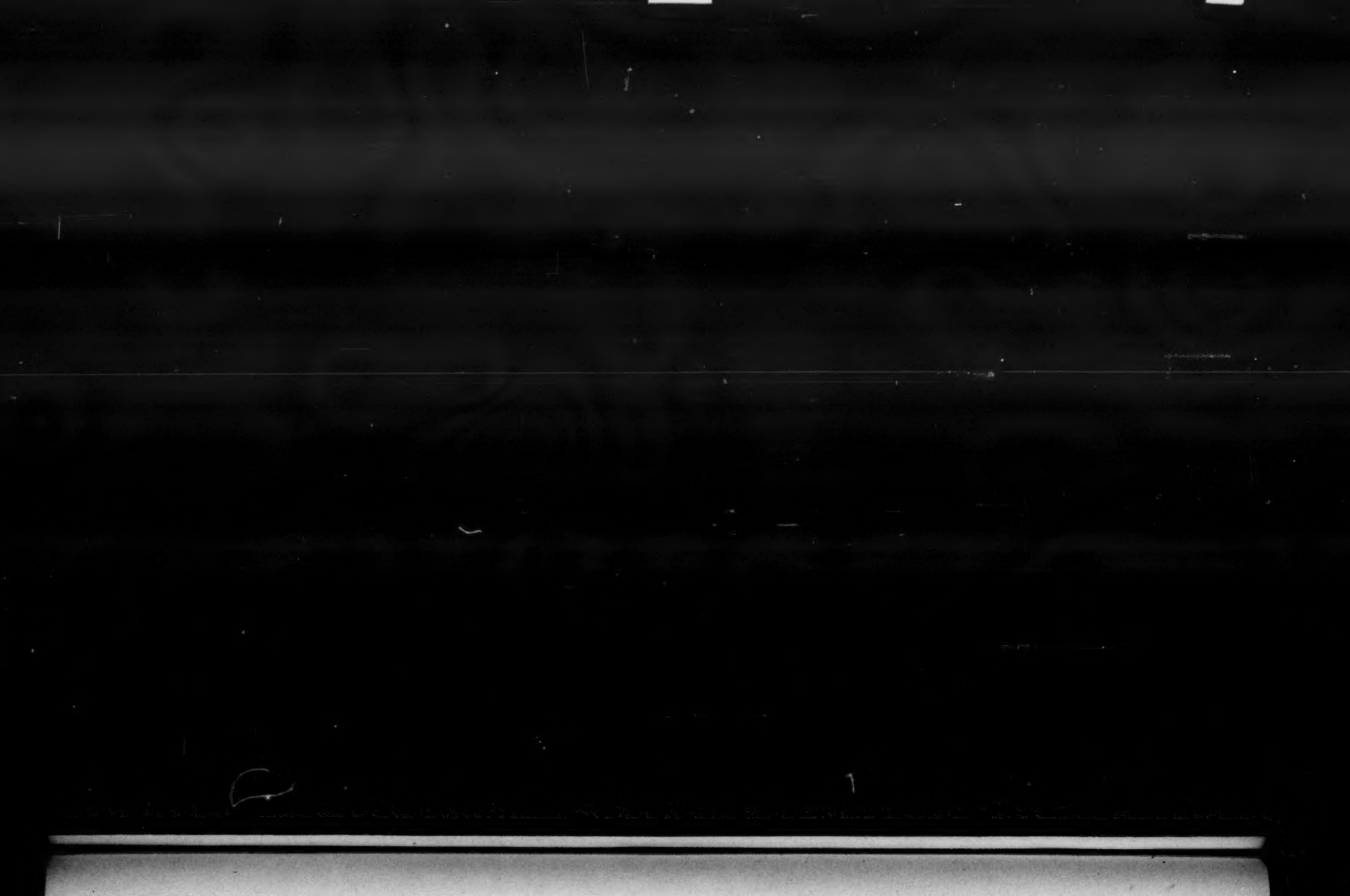
(5) The total white count and the neutrophil count are elevated in both conditions and the author has not found these procedures to be of much value in differentiating the two diseases.

(6) On examining the abdomen of the child with mesenteric lymphadenitis evidence of general peritoneal irritation is usually found. This consists of a moderate degree of tenderness and rigidity over the abdomen. This is more marked in the right lower quadrant but is present in the left lower quadrant to a greater degree than in acute appendicitis.

(7) On auscultation peristalsis is apt to be hyperactive. If this examination is carefully done for some minutes the impression is reached that the hyperperistaltic waves are synchronous with the colicky pain. (Is this disturbance in normal peristalsis neurogenic in origin and caused by presence of enlarged lymph nodes in mesentery? Could they not easily disturb the normal sequence of peristalsis by the effect on the plexus of Auerbach and Meissner? Following this supposition, we have never operated upon a child with intussusception who did not have a quite evident mesenteric lymphadenitis.)

While the above symptoms are not singly pathognomonic of acute mesenteric lymphadenitis if found altogether in a child with an acute abdominal illness this diagnosis should certainly be seriously considered.

If this diagnosis is made is it safe to adopt non operative treatment? The author has done this in a few cases and all patients recovered. The treatment used was entirely symptomatic. In the last case treated sulfadiazine was prescribed. In the next case it will be difficult to resist the temptation to use penicillin.

It is entirely possible that the disease is not of bacterial origin. Our allergy friends might argue that it is an allergic manifestation. Internists might claim that it is neurogenic in origin and akin to herpes. In any event if we can learn to make the diagnosis accurately we think these patients will recover under medical treatment. If the patient is very acutely ill and the differentiation from appendicitis can not be made, certainly the safer plan is to operate.

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